



9/319688

PCT/AU97/00818

S

REC'D 16 DEC 1997

WIPO PCT

Patent Office  
Canberra

I, MARIO PERUSSICH, ASSISTANT DIRECTOR PATENT SERVICES, hereby certify that the annexed are true copies of the Provisional specification and drawing(s) as filed on 12 November 1997 in connection with Application No. PP 0315 for a patent by PAUL DAMIAN NELSON.

I further certify that the annexed documents are not, as yet, open to public inspection.

PRIORITY DOCUMENT

WITNESS my hand this Tenth  
day of December 1997

MARIO PERUSSICH  
ASSISTANT DIRECTOR PATENT SERVICES



BEST AVAILABLE COPY

AUSTRALIA  
Patents Act 1990

AUSTRALIAN	
PROVISIONAL No.	DATE OF FILING
PP0315	12 NOV. 97
PATENT OFFICE	

**PROVISIONAL SPECIFICATION**

**Applicant(s):**

PAUL DAMIAN NELSON

**Invention Title:**

APPARATUS

The invention is described in the following statement:

APPARATUS

This invention relates to a support system and in particular to a bicycle seat.

5

The present invention is an improvement or modification to one of the seats disclosed in my co-pending Australian patent application no. P04055, the contents of which is incorporated into this specification by this reference.

10

This invention may be said, in the first aspect, to reside in a support system, including;

a first support portion and a second support portion for receiving a riders buttocks; and

15

and a hinge for allowing each of the first and second support portions to undergo independent arcuate movement having a component at least in a substantially vertical plane when the rider is seated on the support portions and performing a pedalling motion.

20

This invention may also be said, in the first aspect, to reside in a support system, including;

a first support portion and a second support portion for receiving a riders buttocks;

25

a front portion coupled to the first and second support portions; and

30

and a hinge between the first and second support portions and the front portion for allowing each of the first and second support portions to undergo substantially independent arcuate movement having a component at least in a substantially vertical plane when the rider is seated on the support portions and performing a pedalling motion.

35

According to this aspect of the invention the independent arcuate movement of the support portions provides both comfort and energy return to the person when the person is seated on the support portion and performing a pedalling

motion such as that performed when riding a bicycle. Furthermore because of the movement of the support portions friction is reduced which in turn reduces chaffing.

5 Preferably the first and second support portions are separated by a longitudinal slot. However, in other embodiments the first and second support portions could be connected by a thin longitudinal hinge member so the first and second portions are formed on a single support member  
10 and wherein the longitudinal hinge allows independent arcuate movement of the first and second support portions.

Preferably the hinge comprises a first hinge between the first support portion and the front portion and a second  
15 between the second support portion and the front portion.

Preferably the support system includes an integral shell which includes the first and second support portions, the front portion and the hinge with the hinge being defined by  
20 a transition between the support portions and the front portion.

In the embodiment of the invention where the support system includes the integral shell, the integral shell including  
25 the hinge is preferably formed from a resilient plastics material such as polycarbonate, polyethylene or the like so that the first and second support portions can move in the arcuate direction by flexure of the hinge and the resilient nature of the material will cause the first and second  
30 support portions to tend to return to their initial position as load is removed from them during pedalling motion.

Preferably the shell is provided with upholstery which  
35 covers the shell.

Preferably the support system has connecting means for connecting the support system to an article, the connecting means being coupled to the front portion between a front end of the front portion and the hinge so as not to  
5 interfere with flexing movement of the hinge and the arcuate movement of the first and second support portions.

Preferably the connecting means comprise connecting rails.

10 In one embodiment the connecting rails are coupled to the shell by embedding portions of the rails into the shell when the shell is formed. In other embodiments the rails may be coupled to the shell by securement members which are attached to the shell or which are formed integral with the  
15 shell. In still further embodiments the rails may be formed integral with the shell.

Preferably support portions are cupped shaped for receiving the ischial bone region and buttock region of a rider.

20 Preferably the front portion comprises a truncated nose.

In one embodiment the front portion includes a soft padding to extend the length of the truncated nose. In this  
25 embodiment the soft padding merely collapses when contacted by a rider so that the front portion has the appearance of a conventional bicycle seat with an elongated nose but the front portion preforms little or no vertical support function for a rider. In this embodiment, the front  
30 portion may provide some lateral support function to assist in stability and centring of the rider on the seat.

A further aspect of the invention may be said to reside in a support system including;

35 first and second support portions, the first and second support portions each having a depression for

receiving the ischial regions of a persons anatomy;

a raised portion between and forward of the  
depressions of the first and second support portions, for  
receiving the ramus of the ischial regions or the ischial  
5 regions of a persons anatomy;

and a nose section which extends forwardly of the  
support portions and which declines from the support  
portions towards a front end of the nose section.

10 In this aspect of the invention the support is configured  
so that most of the riders weight will be centred on the  
ischial bones and buttock region of the rider and supported  
in the depressions of the first and second support  
portions. This therefore decreases the amount of  
15 compression of the users anatomy other than the vicinity of  
the ischial bones to increase comfort and prevent  
significant pressure from being applied to other portions  
of the buttocks outside the ischial region.

20 Preferably the first and second support portions are  
separated by an elongated slot.

Preferably the first and second support portions and the  
front portion are integral with one another by being made  
25 as an integral shell.

Preferably the support portion includes upholstery on the  
shell.

30 A further aspect of the invention may be said to reside in  
a support system, including;

a support portion for receiving a users buttocks;  
a truncated nose extending forwardly from the  
support portion;

35 a soft collapsible upholstery member provided on  
the nose portion for extending the nose portion forwardly  
and/or upwardly with respect to the support portions.

According to this aspect of the invention the self collapsible member on the nose portion gives the seat the appearance of a conventional bicycle seat but nevertheless  
5 performs little or no vertical support function because of the collapsibility of the material when pressure is applied to it. This reduces pressure to the soft tissue of the nose section against a user when on the support system. The soft collapsible material provides a centring member so  
10 that a person can centre him or herself on the support portion relative to the truncated nose and the collapsible material and truncated nose may also provide some lateral support to assist centring and stability of a rider when seated on the support system.

15 The self collapsible material may be a foam or sponge material or polyethylene or the like.

Preferably the support portions and truncated nose are  
20 formed as a integral shell from plastics materials such as polycarbonate, polyethylene or like material.

The invention may also be said to reside in a bicycle seat, including:

- 25 a unitary shell having a nose portion and a rear portion, the shell being formed from a flexible material;
- a slot in the rear portion dividing the rear portion into two separate support portions; and
- each of the support portions being independently  
30 movable relative to the nose portion and each other by flexure of the flexible material from which the shell is formed so that a transition between the two separate support portions and the nose portion forms a hinge allowing the two separate support portions to undergo  
35 substantially independently movement when a rider is seated on the bicycle seat and pedalling a bicycle.

Preferably the bicycle seat includes a cushioning skin over an upper surface of the unitary shell.

5 Preferably the shell has an upper surface and a lower surface, a plurality of ribs projecting from the lower surface.

10 Preferably a mounting rail is coupled to the lower surface of the shell.

Preferably the nose portion has an undercut for receiving a front portion of the mounting rail to secure the front portion of the mounting rail to the shell.

15 Preferably stop means is provided for limiting movement of the two support portions.

20 Preferably the stop means comprise end portions of the mounting bracket which are spaced from the lower surface of the shell.

A further aspect of the invention may be said to reside in a bicycle seat, including:

- 25 a nose portion;
- a rear support portion coupled to the nose portion, the rear support portion having first and second support portions;
- a hinge for allowing each of the first and second support portions to undergo substantially independent
- 30 movement relative to one another and the nose portion, the independent arcuate movement having a component at least in a substantially vertical plane when the rider is seated on the support portions and forming a pedalling motion; and
- 35 stop means for limiting the amount of movement of the first and second support portions.



Preferably the bicycle seat includes a mounting rail for mounting the seat to a bicycle and the stop means comprises end portions of the mounting rail which are spaced from the first and second support portions and positioned below the first and second support portions.

The invention in a further aspect may be said to reside in a bicycle seat, including:

- a nose portion;
- a rear portion for receiving a rider's buttocks;
- the nose portion and rear support portion having an upper surface and a lower surface;
- a mounting rail coupled to the lower surface;
- a cut-out in the nose portion for receiving a front portion of the mounting rail to hold the front portion of the mounting rail to the bicycle seat; and
- securing means for securing the mounting rail to the lower surface substantially at a middle portion of the lower surface so the rear portion is free and not connected to the mounting rail.

Preferably the securing means comprises a bracket and bolt and nut for clamping the mounting rail to the lower surface.

Preferably the bolt is embedded in the shell for receiving the nut and the bracket to couple the bracket and therefore the mounting rail to the bicycle seat.

Preferred embodiments of the invention are described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is top perspective of a bicycle seat embodying the invention;

Figure 2 is a side view of the seat of Figure 1;

Figure 3 is a view along the line III-III of  
Figure 1;

Figure 4 is a view along the line IV-IV of  
5 Figure 1;

Figure 5 is a view along the line V-V of  
Figure 1;

Figure 6 is a view along the line VI-VI of  
Figure 1;

10 Figure 7 is a top perspective view of a bicycle  
seat according to a second embodiment of the invention;

Figure 8 is a side view of the seat of Figure 7;

Figure 9 is a top perspective view of a bicycle  
seat according to a third embodiment of the invention;

15 Figure 10 is side view of the seat of Figure 9;

Figure 11 is a view along the line XI-XI of  
Figure 9;

Figure 12 is a view along the line XII-XII of  
Figure 9;

20 Figure 13 is a view along the line XIII-XIII of  
Figure 9;

Figure 14 is a view along the line XIV-XIV of  
Figure 9;

25 Figures 15, 16, 17, 18, 19, 20, 21 and 22 are  
views various mounting rails for connecting the bicycle  
seat of the preferred embodiments to a bicycle;

Figure 23 is a plan view of a further embodiment  
of the invention;

30 Figure 24 is a front view of the embodiment of  
Figure 23;

Figure 25 is a rear view of the embodiment of  
Figure 23;

Figure 26 is an underneath view of the embodiment  
of Figure 23;

35 Figure 27 is a view along the line A-A of

Figure 23;

Figure 28 is a view along the line B-B of  
Figure 23;

Figure 29 is a view along the line C-C of  
5 Figure 23;

Figure 30 is a side view of the embodiment of  
Figure 23;

Figure 31 is a view along the line D-D of  
Figure 23;

10 Figure 32 is a view along the line E-E of  
Figure 23;

Figure 33 is a view along the line F-F of  
Figure 23;

Figure 34 is a perspective view of a mounting  
15 raised used in the embodiment of Figure 23;

Figure 35 is a front view of the mounting rail of  
Figure 34; and

Figure 36 is a side view of the mounting rail of  
Figure 34.

20

With reference to Figures 1 and 6, a bicycle seat 10 is  
shown which has an integral shell 11 including first and  
second support portions 12 and 14 which are separated by a  
longitudinal slot 16. The shell 11 also has a front  
25 portion 18 which forms a nose of the seat 10 and which is  
integrally coupled to the support portions 12 and 14.

The nose 18 and support portions 12 and 14 are coupled  
together by first and second hinges 20 and 22 which are  
30 also integral with the nose 18 and support portions 12 and  
14 and which are formed by a transition between the nose 18  
and support portions 12 and 14.

The shell 11 may be covered by upholstery 25 (see Figures  
35 3, 4, 5 and 6) which is formed from conventional padding  
material.

In the preferred embodiment of the invention where the hinges 20 and 22 are integral with the remainder of the shell 11, the shell is formed from a flexible material, for example, plastics material such as polycarbonate or polyethylene so that the combined effect of the slot 16 and the transition from the nose portion 18 to the support portions 12 and 14 allows flexing movement of the support portions 12 and 14 about the hinges 20 and 22 relative to the front portion 18. However, in other embodiments the hinges 20 and 22 could be formed from suitable flexible material which is connected to separate front portion 18 and support portions 12 and 14 which, in turn, are formed from rigid material. Further still, in other embodiments rather than providing the slot 16 a thin narrow longitudinal hinge line (not shown) may be provided between the portions 12 and 14 so that the portions 12 and 14 are effectively formed as a single member with the portions 12 and 14 being able to move independently with respect to one another about the longitudinal hinge which joins the support portions 12 and 14.

The support portions 12 and 14 are a mirror image with respect to one another and, as will be evident from the cross-sectional views forming Figures 3 to 6, have a depression or recess 30 so that they are generally cupped shaped in configuration so as to snugly receive a portion of a riders buttocks adjacent the ischial bones. As is also apparent in Figure 2 the portions 12 and 14 incline upwardly slightly relative to the front portion 18.

The support portions 12 and 14 may also be provided on the underside of the shell 11 with a plurality of integral ribs 27 which extend from a rear end of the support portions 12 and 14 to a position rearwardly of the hinges 20 and 22 as can be clearly seen in Figures 3 and 4.

As is best seen in Figures 3 to 6 the portions 12 and 14 (only the portion 12 being shown in Figures 3 and 4) have a rim 32 which surrounds the depressions or recesses 30. The rim 32 has a downwardly curved outer edge 33. As also  
5 shown in Figure 2 a connecting rail 40 is coupled to the seat 10. The rail 40 is connected between the hinges 20 and 22 and front end 42 of the nose 18 so that the rail 40 is confined to the nose 18 and does not interfere with movement of the hinge 22 or support portions 12 and 14.  
10 Thus, when the rail 40 is coupled to a bicycle to secure the seat 10 to the bicycle (in a manner which is known) the front portion 18 is held substantially still and the support portions 12 and 14 are able to move by flexing movement of hinges 20 and 22 relative to the front portion  
15 18.

As is best shown in Figure 4 the shell 11 may be provided with an enlarged thickness portion 50 just forward of the hinges 20 and 22 and also an enlarged thickness portion 52  
20 at the front end 42 of the nose 18. The enlarged thickness areas 50 and 52 can provide bosses for receiving the rails 40 to secure the rails 40 to the shell 11. Preferred methods of connecting the rails 40 to the shell 11 will be described in more detail hereinafter with reference to  
25 Figures 15 to 22.

As is best shown in Figure 6 the nose 18 is preferably of inverted U-shape in cross-section and forms a raised portion 19 between the depressions or recesses 30 of the  
30 support portions 12 and 14. As best shown in Figures 3 and 4 the nose 18 is angled downwardly from the hinges 20 and 22.

When a rider is seated on the bicycle seat of Figures 1 to  
35 6 and commences pedalling motion the movement of the buttocks of the rider during pedalling will cause general

oscillating movement of the support portions 12 and 14 about hinges 20 and 22 independently of one another so that the portions 12 and 14 move in an arcuate manner as shown by arrow A in Figure 2. The arcuate movement is mainly in a substantially vertical plane which is parallel to the longitudinal axis of the bicycle so that the arcuate movement has a major component in that vertical plane. However, some lateral movement of the portions 12 and 14 may also take place as shown by arrows B in Figure 5 so that the arcuate movement also has a component in a generally vertically plane which is perpendicular to the longitudinal axis of the bicycle. Thus, the arcuate movement in the vertical plane which is perpendicular to the axis of the bicycle is generally a minor component movement compared to the arcuate movement which is in the plane parallel to the longitudinal axis of the bicycle.

The arcuate movement of the support portions 12 and 14 provides comfortable support for the rider as the rider pedals the bicycle and also some energy return back into the users body due to the generally spring action or flexing provided by the hinges 20 and 22 which tends to return the portions 12 and 14 to their starting position as the rider moves. Thus, the rider is comfortably supported in an energy sufficient manner for pedalling of the bicycle.

In the embodiments of Figures 1 to 6 the seat 10 has the appearance of a generally conventional long nosed bicycle seat apart from the slot 16. If the slot 16 is covered by the upholstery material the seated embodiments of Figures 1 to 6 would, for intense purposes, look like any conventional long nosed leather bicycle seat.

The embodiment of the invention shown in Figures 7 and 8 has the same general appearance as the embodiment of

Figures 1 to 6 and is structured identically to Figures 1 to 6 except that the front portion 18 of the shell 11 is in the form of a truncated nose 18 which is much shorter than the nose 18 in the embodiments of Figures 1 to 6. In the  
5     embodiments of Figures 7 and 8 the upholstery 25a is much thicker in the front portion 21 of the seat 10 and effectively extends the length of the front 21 so that the front portion 21 has the same appearance as the nose 18 in Figures 1 to 6. However, the upholstery 25a which is in  
10     the vicinity of the nose 18 and extends the length of the front portion 21 in the embodiment of Figures 7 and 8 is of a very soft material such as soft foam or sponge material, "nerf" type material, polyethylene or like material so that it will readily collapse as soon as the user places any  
15     weight on it at all. Thus, the front portion 21 in embodiments of Figures 7 and 8 provides little or no support in the vertical direction and therefore reduces the pressure of the soft tissue of a rider when pedalling. The purpose of the soft upholstery portion 25a in the  
20     embodiments 7 and 8 is merely to give the appearance of a conventional seat whilst at the same time reducing the support function of the nose 18 and also therefore reduces pressure to soft tissue.

25     The front portion 21 in the embodiment of Figures 7 and 8 does provide some centring datum so that the rider can properly centre himself on the support portions 12 and 14 relative to the front portion 21 and also provide some lateral stability for the rider when seated on the seat and  
30     during cornering. Nevertheless, the general support provided by the front portion 21 in the embodiments of Figures 7 and 8 is intended to be considerably less than that provided in the previous embodiment and the very soft upholstery material 25a is intended to collapse when weight  
35     is applied to it so as to basically form no load bearing function thereby reducing any chaffing which the nose portion of a bicycle seat normally produces.

Apart from the inclusion of the truncated nose section 18 and the relatively thicker yet softer upholstery material 25a in the front portion 21 the bicycle seat of Figures 7 and 8 functions in exactly the same manner as that of Figures 1 to 6.

Figures 9 and 10 show a third embodiment of the invention which is also similar to Figures 1 to 6 except that in this embodiment the front portion 18 is in the form of a truncated nose 18 substantially identical to that of Figures 7 and 8. However, in this embodiment the elongated soft upholstery material of Figures 7 and 8 is not provided so that the seat has the appearance of a very short nosed seat as is evident from Figures 9 and 10.

As is shown in Figures 11 to 14 upholstery material 25 is provided and generally follows the contour of the shell 11 of Figures 9 and 10 similar to the upholstery 25 in Figures 1 to 6.

In the embodiments of Figures 9 to 14 the ribs 27 run the entire length of the shell 11 from rear 55 to front end 42 and the support portion 12 and 14 are slightly wide then in the embodiment of Figures 1 to 6.

The hinges 20 and 22 at support portion 12 and 14 of the embodiment of Figures 9 to 14 operates in precisely the same manner as in the embodiment of Figures 1 to 6.

Figures 15 to 22 show preferred ways of coupling the mounting rails 40 to the shell 11 of the bicycle seat 10. In Figure 15 a plate 70 is provided and rails 40 are connected to the plate 70. The plate 70 can be bolted or glued to shell 11 or can be embedded in the shell 11 between the hinges 20 and 22 and the front 42 of the nose 18 during moulding of the shell 11.



Figure 16 shows a slightly different configuration of the rails 40 in which the rails 40 are formed from a single piece having a U-shaped transition 41. The ends of the rails 40 are provided with circular plates 43 which can be embedded in the shell 11 when the shell is moulded.

Figure 17 shows an embodiment similar to that shown in Figures 3 and 4 where the rails 40 have laterally projecting ends 47 which are received in the thickened portions 50. The ends 47 may be embedded in the thickened portions 50 when the shell 11 is moulded or alternatively holes may be provided in the thickened portions 50 for receiving the ends 47. The U-shaped transition 41 can be received in a slot in portion 52.

The distance between the thickened portions 50 and 52 and the size of the rails 40 may be such that when the rails 40 are located in place they are placed under slight tension to securely maintain the rails 40 in place on the shell 11.

Figure 18 shows an embodiment in which the nose 18 has moulded to it two generally cylindrical bosses 59 which are provided with holes 61 for receiving the ends 47 of the rails 40. The transition 41 of the rails may be received in slot 74 at the front 42 of the nose 18.

Figure 19 is a side view of the nose 18 and rails 40 according to the embodiment of Figure 18 more clearly showing the location of the transition portion 41 in the slot 74. In this embodiment a fastener 75 may be located through a return portion 18' of the nose 18 to securely hold the transition portion 41 of the rails 40 in place in the slot 74.

Figure 20 merely shows a different embodiment of the rail

40 wherein the rail is provided with ends 47' which are turned inwardly in the opposite direction to the direction of the ends 47 in Figures 17, 18 and 19. In this embodiment the transition portion 41 is square in shape rather than U-shaped as in the earlier embodiments. The legs 47' could be embedded in the shell 11 during the moulding.

Figure 21 shows a further embodiment in which a stud 80 can be embedded in the shell 11 when the shell 11 is formed. The stud 80 has a sleeve 82 having screw threads 83. Stud 80 also has a base 85 which has prongs 87 which embed in the shell 11 to securely locate the stud in place. The rails 40 are provided with screw threads 40' on a free end thereof which screw into the screw threads 83 in the sleeves 82.

Figure 22 shows a further embodiment in which the rails 40 are formed integrally with the nose 18 from the same material as the nose 18. In this embodiment the rails 40 have integral legs 65 which extend between the rails 40 and the nose 18 to couple the rails to the shell 11.

The embodiment of figure 1 is a sleeker design for more high performance applications and may be relatively light whereas figure 9 is designed more for additional lateral width for recreational purposes.

Figures 23 to 36 show a fourth embodiment of the invention in which like reference numerals indicate like parts to those previously described.

As in the previous embodiments the seat is formed from a shell 11 of resilient material such as injection moulded plastics material, for example, nylon or polypropylene. An

upholstery 25 may be provided over the upper surface 11a of the shell 11 as will be described in more detail hereinafter.

5 The shell 11 has rear buttock support portions 12 and 14 separated by a slot 16 and a front nose portion 18. Once again an integral hinge is formed in the regions 20 and 22 between the support portions 12 and 14 and the nose 18 so that the support portions 12 and 14 can undergo independent  
10 arcuate movement relative to one another and also the nose section 18 in the same manner as has been previously described.

The support portions 12 and 14 are slightly dish-shaped in  
15 the areas 30 and rise upwardly to the portion 19 and also upper peripheral edge 110 which delimits the rear support portions 12 and 14. The contouring will be more fully described and apparent from the cross-sectional drawings which will be described hereinafter.

20 As is clear from Figures 24 and 25 the shell 11 also includes a downwardly projecting skirt portion 112 which extends about the periphery of the seat from upper peripheral edge 110 to lower extremity 132. The skirt  
25 portion 112 is of greatest height at the side of the seat as shown in Figures 29 and 31, slightly of less height at the rear as shown in Figure 32 and of lowermost height at the front portion of the nose 18 as shown in Figure 31.

30 As is apparent from Figures 25 and 26 the lower surface 11b of the shell 11 has downwardly projecting ribs 114. The ribs 114 are of generally curved contour and outermost rib 114' (see Figure 26) is somewhat longer than the middle rib 114'' which, in turn, is somewhat longer than the innermost  
35 rib 114''' of each of the support sections 12 and 14.

As shown in Figure 27 mounting rail 40 is secured to the lower surface 11b by a nut 116 and bracket 118. A bolt 117 is embedded in the shell 11 for receiving the nut 116 (as best seen in Figure 31). The shell 11 has a cut-out 120  
5 which receives a front portion 122 of the rail 40 as will be described in more detail hereinafter to secure the front portion 122 of the rail 40 to the shell 11.

The bracket 118 clamps the rail 40 to the lower surface 11b  
10 of the shell 11. The bracket 118 may have curved sections 126 for accommodating the rail 40 and securely fastening the rail 40 to the shell 11. The lower surface 11b of the shell may also have guide projections (not shown) for correctly positioning the rail 40. The rail 40 will be  
15 more fully described with reference to Figures 34 to 36.

Figures 27 to 29 are cross-sectional views across the seat of Figure 23 showing the curvature of the nose portion 18 and the support portions 12 and 14 in a direction  
20 transverse to the longitudinal direction of the seat and the bicycle upon which the seat will be used.

As can be clearly seen from Figures 27, 28 and 29 the lower extremity 132 of the shell 11 is formed with a step 130 on  
25 the lower surface 11b. Step 130 accommodates the upholstery material 25 so that the upholstery material can wrap around the bottom extremity 132 (see Figure 28) of the shell 11 and still remain flush with the lower surface 11b of the shell 11. This assists in securing the upholstery  
30 25 to the shell 11 by increasing the surface area and also prevents the likelihood of any contact beneath the seat rolling the upholstery from the lower extremity 132 as would more likely be the case if the upholstery 25 is not flush with the lower surface 11b of the shell 11.

The upholstery 25 is preferably formed by a self-skinning polyurethane which in a moulding process adheres onto the shell 11, foams into the desired moulded shape and provides cushioning for the bicycle seat. The outer surface of the polyurethane upholstery 25 forms a firm skin formed with any desired texture. The moulding of the shell 11 and the upholstery 25 can therefore be formed in a single operation. Alternatively, upholstery 25 can be formed separately and connected to the shell 11 in a separate operation. Furtherstill, the application of the upholstery can be a combination of the two processes, for example, the cushioning can be formed in the moulding process and a outer cover or skin can be adhered onto the moulded cushioning to complete the upholstery 25. Apart from adhering the upholstery 25 to the shell 11 in a moulding operation or by a separate adhesive process, the upholstery 25 can be stapled onto the shell or otherwise fixed to the shell 11.

20

Figure 29 also shows a thickened region 147 arranged directly above the rear portions 145 of the rails 40 which form the stop members, the thickened portions 147 are slightly angled as shown in Figure 29 and provide a reinforced area on the lower surface 11b of the shell 11 so that when the seat bottoms out and contacts the end portions 145, the thickened areas 147 provide added strength to resist any tendency for fracturing of the shell 11 and wearing through of the shell 11 due to contact between the lower surface 11b and the end portions 145. Generally the thickened areas 147 are in the form of a strip which follows the end portions 145 and arranged directly above the end portions 145 as shown in Figure 29.

35 Figure 30 shows a side view of the seat and as apparent from Figure 30 the seat is normally positioned in a slightly inclined position. The rail 40 has a connection

section 141 which will couple to a clamp assembly on a bicycle so as to connect the seat to the bicycle. The clamp assembly allows for some arcuate adjustment of the seat so that the angle and position of the seat can be  
5 adjusted from that shown in Figure 30 between a more inclined position and a less inclined position depending on the rider's requirement. Generally a more inclined position will be used for high performance riding such as racing and a lower incline will be used for more  
10 recreational and comfortable riding.

Figure 30 also shows the seat mounted on a bicycle generally designated by the reference numeral 200. The bicycle 200 includes a frame 201 having a sleeve or hollow  
15 socket 203, a central frame member 204 and a downwardly inclined and rearwardly extending frame member 205. Other frame components and parts of the bicycle are not shown in Figure 30. The sleeve 203 receives in telescopic fashion, a support post 207 which can be locked in position by a nut and bolt 209 which clamps a flange portion 211 of the  
20 sleeve 203 to clamp the sleeve 203 about the post 207. The post 207 carries a clamp assembly 209 which engages the rails 40 at the portions 141. The clamp assembly 209 is clamped in position and seats on a cup-shaped support  
25 portion 210 at the top of the post 207. A bolt 212 and nut 213 pass through the portion 210 and the clamp 209 to clamp the clamp 209 to the rails 40 and also to locate the clamp portion 209 on the portion 210. By loosening the bolt 212, the rails 40 can be moved back and forward in the direction  
30 of double headed arrow H within the clamp 209 and the clamp 209 can be pivoted slightly on surface 215 of cup-shaped portion 210 to position the seat 10 shown in Figure 30 in the desired orientation relative to the bicycle frame 201.

Figures 31 to 33 are cross-sectional views along the lines D-D, E-E and F-F respectively and show the contour of the nose portion 18 and support portions 12 and 14 in the direction of the longitudinal axis of the seat and bicycle upon which the seat is to be used.

Figure 31 shows bolt 117 embedded in hole 124 in the shell 11 which receives the nut 116 to retain the bracket 118 in clamping engagement with the rail 40 to secure the rail 40 to the shell 11. Figure 31 also shows that the nose section 18 of the shell includes the undercut 120 which is in the form of a slot or a socket for receiving front portion 122 of the rail 40. Thus, the front 122 of the rail 40 is securely held in the undercut 120 and the rear portion of the rail 40 is secured to the shell 11 by the bracket 118 so that the rail 40 is securely held to the shell 11 for mounting onto a bicycle.

Figures 32 and 33 show the dish-shaped contouring of the portions 12 and 14 and the fact that the contour rises upwardly to the upper periphery 110 of those portions. The raised portion 19 is also clearly shown.

As is show in Figures 32 and 33 the mounting bracket 40 has rearwardly extending free end sections 145 which are spaced from the lower surface 11b of the shell 11. The rear portions 145 form stop members which limit the amount of flexing movement of the portions 12 and 14 relative to one another and the nose 18 so that if a rider is pedalling the bicycle and severely high load is applied to the portions 12 and 14, such as may occur if going over bumps or the like, which would otherwise cause the portions 12 and 14 to flex about their hinges 20 and 22 to such a degree where the seat may be permanently distorted or broken, the end portions 145 will contact the lower surface 11b adjacent the portions 12 and 14 to limit the amount of movement of

the portions 12 and 14 to prevent permanent distortion or breaking of the seat. The end portions 145 being spaced from the lower surface 11b of the shell 11 is also clearly shown in Figure 29. Thus, with reference to Figure 29, 5 downward movement of the portions 12 and 14 in the direction of arrow M in Figure 29 will be limited by the end portions 145. The spacing between the end portions 145 and the lower surface 11b will be dependent on the amount of movement required of the portions 12 and 14 and the 10 material from which those portions are made.

As in the earlier embodiments the dish-shaped depressions 30 are contoured to receive the ischial region of the anatomy where a majority of the rider's weight will be 15 supported. The nose portion 18 is not intended to bear much, if any weight and normally sweeps downwards from the raised portion 19. The nose 18 can act to give a centring and stabilising effect by contact with the inner thighs, for example, when cornering. The ribs 114 can be 20 positioned to control the amount of flex about the hinges 20 and 22 formed by the transition of the shell 11 from the support portions 12 and 14 to the nose portion 18. Increasing the length and size of the ribs will tend to increase stiffness and therefore decrease the amount of 25 flexing movement provided by the hinges 20 and 22. Furthermore, by altering the direction of the ribs 114 relative to the longitudinal axis of the bicycle and the seat the nature or the arcuate movement of the support portions 12 and 14 can change from an arcuate movement 30 generally in a plane parallel to the longitudinal axis of the seat and the bicycle upon which the seat is mounted to arcuate movement in a more lateral direction in a plane transverse with respect to the longitudinal axis of the seat and bicycle upon which the seat is mounted. The flex 35 is also determined by the shell design and the material of



the shell. Stiffer seats may be used for racing to provide quicker energy return by the flexing movement of the portions 12 and 14 and more flexible seats can be used for recreational use to increase comfort. The direction of the flex also depends on the use. The arcuate movement may be more linear (that is, in the longitudinal direction of the seat and bicycle) for racing whilst for recreational use it may be more lateral, (that is, in a plane transverse to the longitudinal axis of the seat).

The seat may be used without the upholstery 25 in which case the shell 11 is preferably provided with a textured finish on the upper surface 11a to prevent slippage.

As previously mentioned, the shell 11 is formed most preferably by injection moulding and plastics additives such as glass fibre or the like can be added to stiffen the seat or otherwise alter the characteristics of the arcuate movement of the portions 12 and 14.

Figures 34 to 36 show the rail 40 in more detail.

As shown in Figures 34 to 35 the rail 40 includes the front portion 122 which is received in the undercut 120 of the shell 11. The front portion 122 is generally semicircular and a pair of downwardly and outwardly curved transition sections 151 which extend from the front portion 122. A pair of parallel connecting rails 141 extend from the transition sections 151 rearwardly to upwardly extending sections 153. The pair of upwardly extending sections 153 extend into a pair of rearwardly and slightly upwardly inclined sections 157 and those sections extend into outwardly extending sections 159 which, in turn, extend into the end sections 145 which form the stop members.

The rail portions 141 are the portions of the mounting rail 40 which couple onto a clamp arrangement of a bicycle to secure the seat to the bicycle.

- 5 The sections 157 form abutment sections which abut the lower side 11b of the shell 11 and which are engaged by the clamp bracket 118 to secure the rear portion of the mounting rail 40 to the shell 11 as has been described.
- 10 Since modifications within the spirit and scope of the invention may readily be effected by persons skilled in the art, it is to be understood that this invention is not limited to the particular embodiment described by way of example hereinabove.

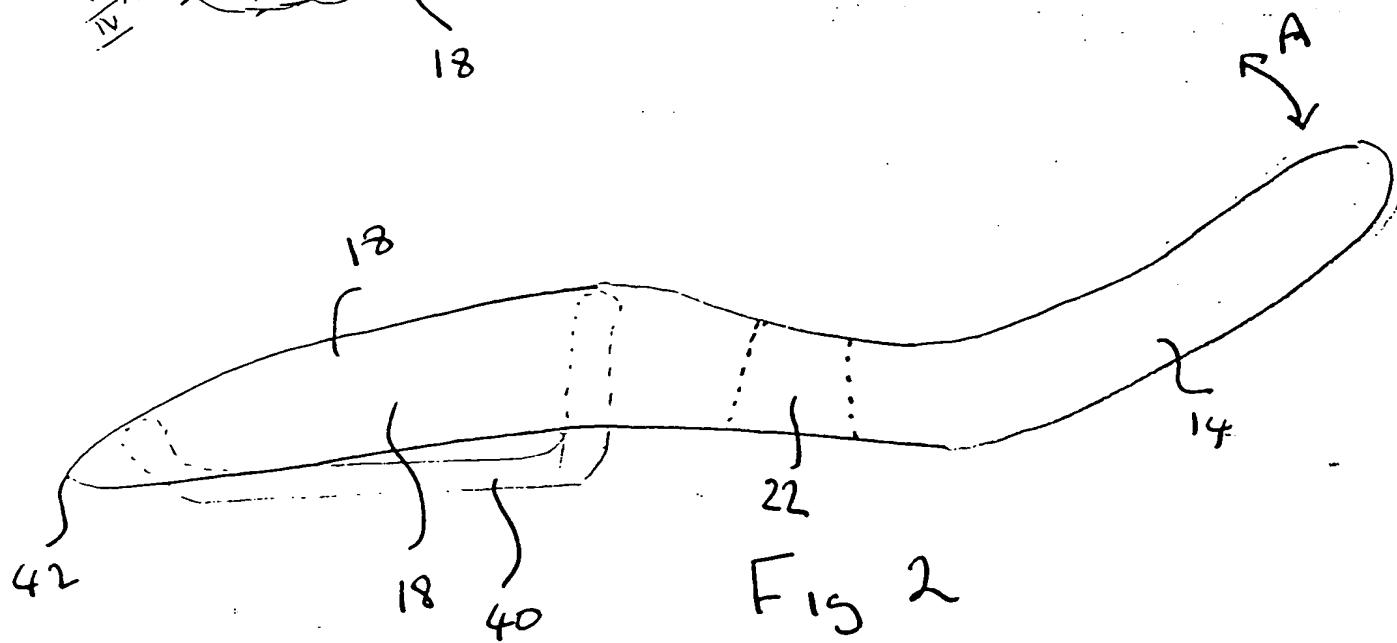
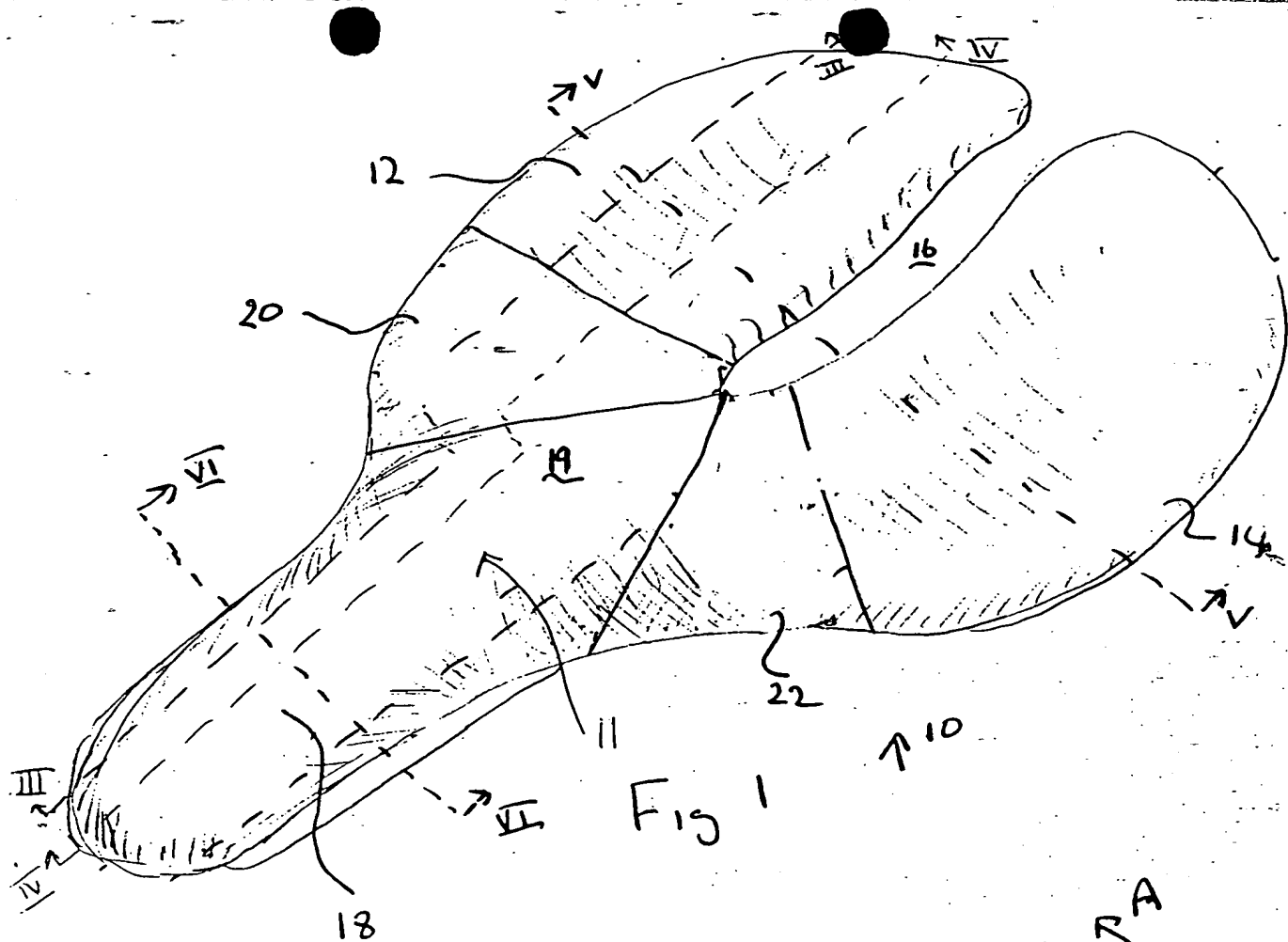
15

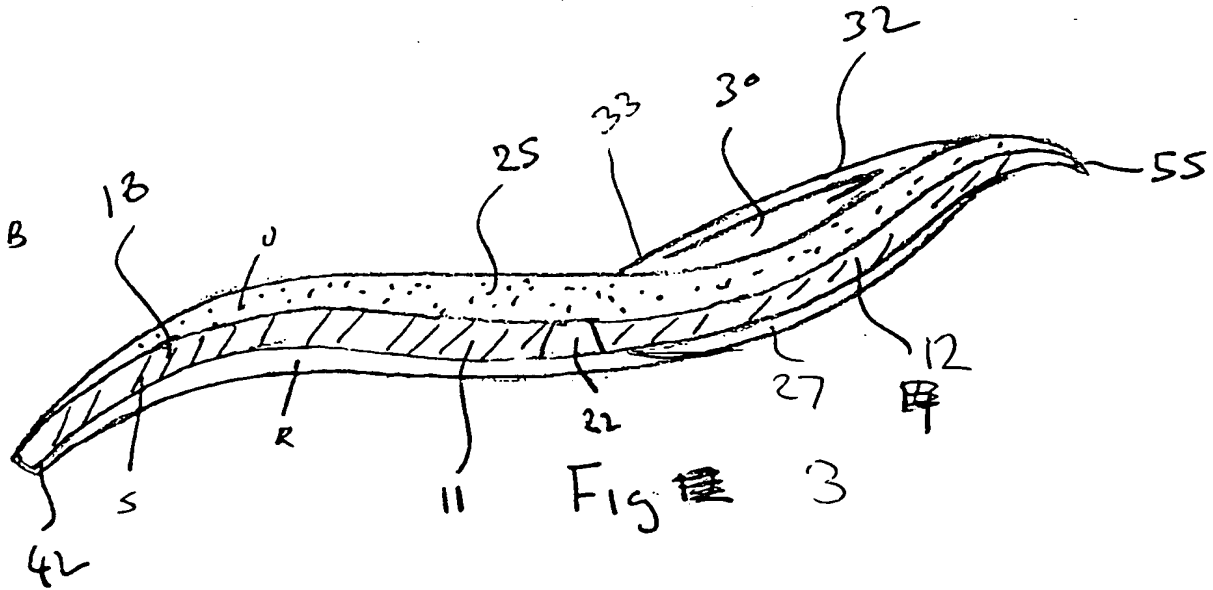
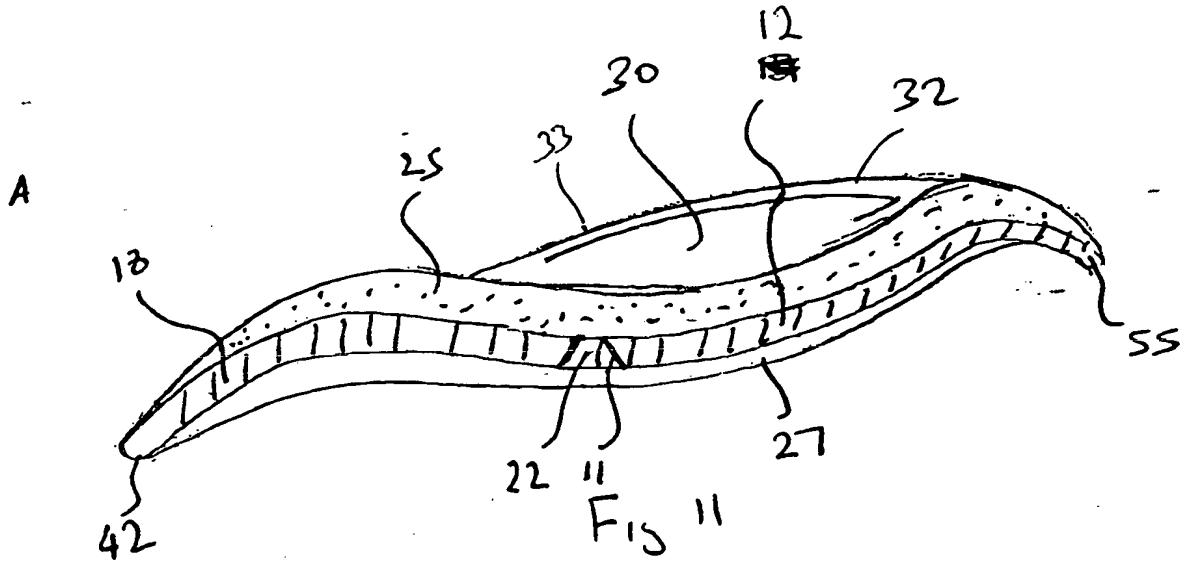
Dated this 12<sup>th</sup> day of November 1997.

PAUL NELSON  
20 By His Patent Attorneys

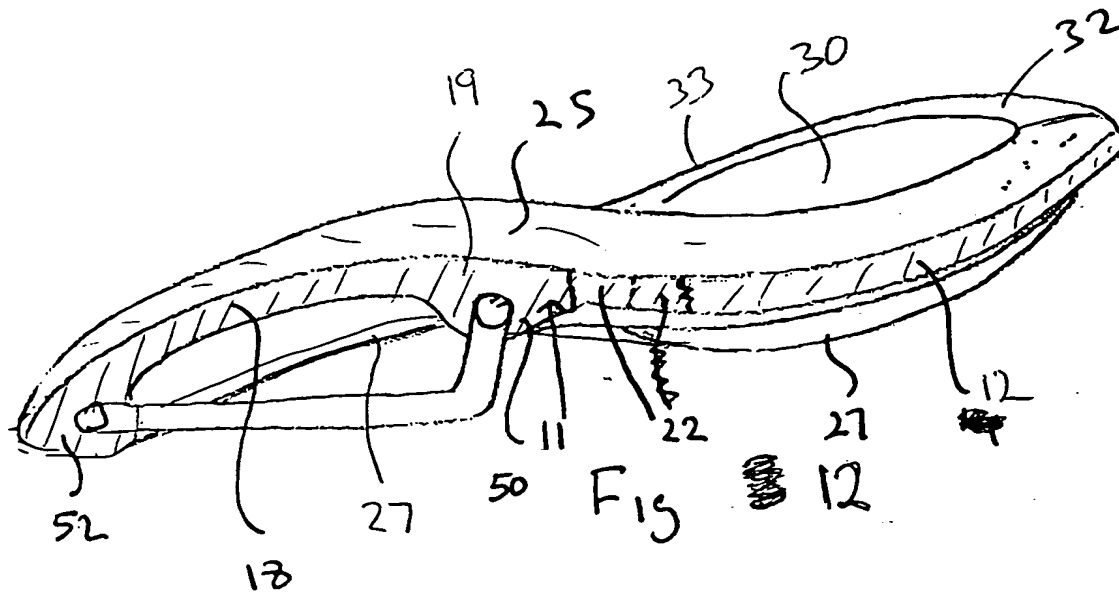
GRIFFITH HACK  
Fellows Institute of Patent  
Attorneys of Australia.

25

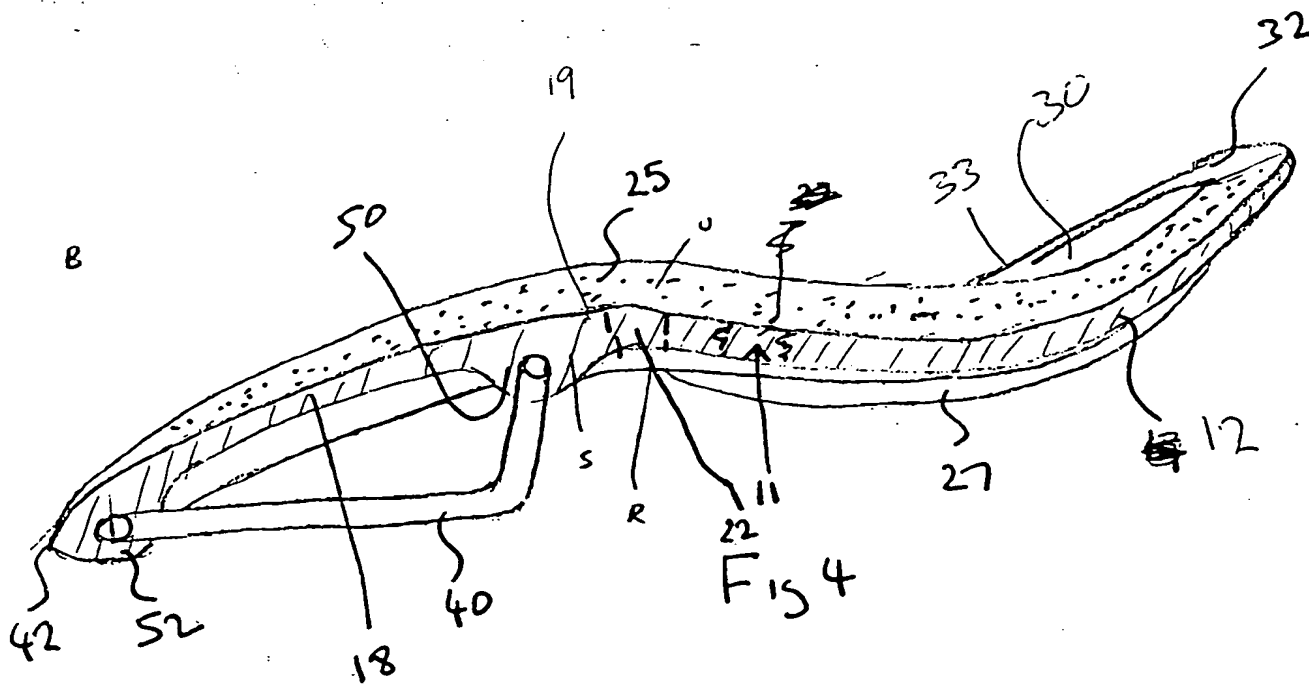


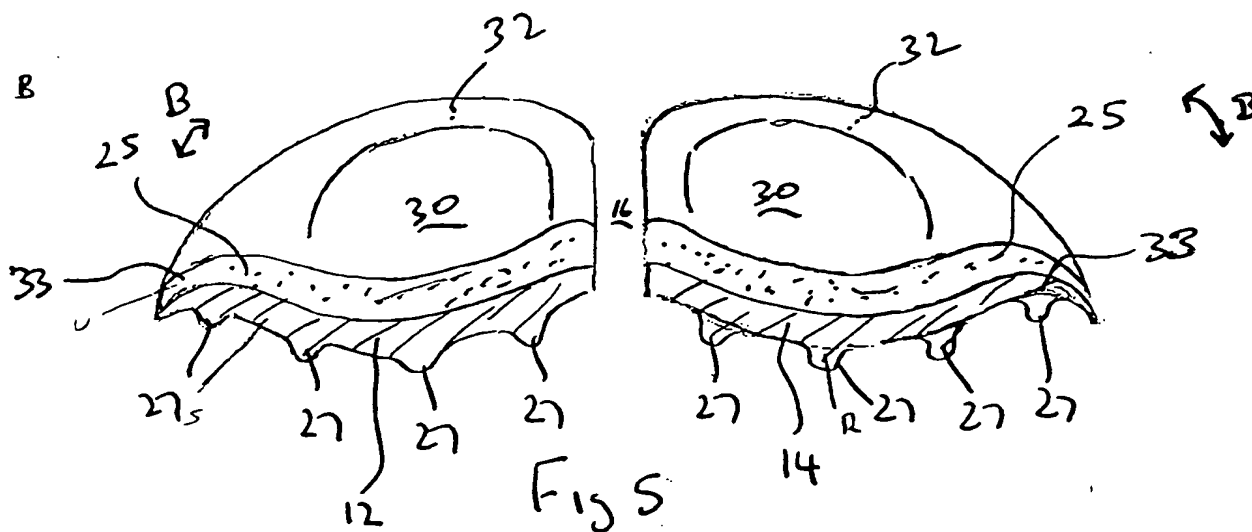
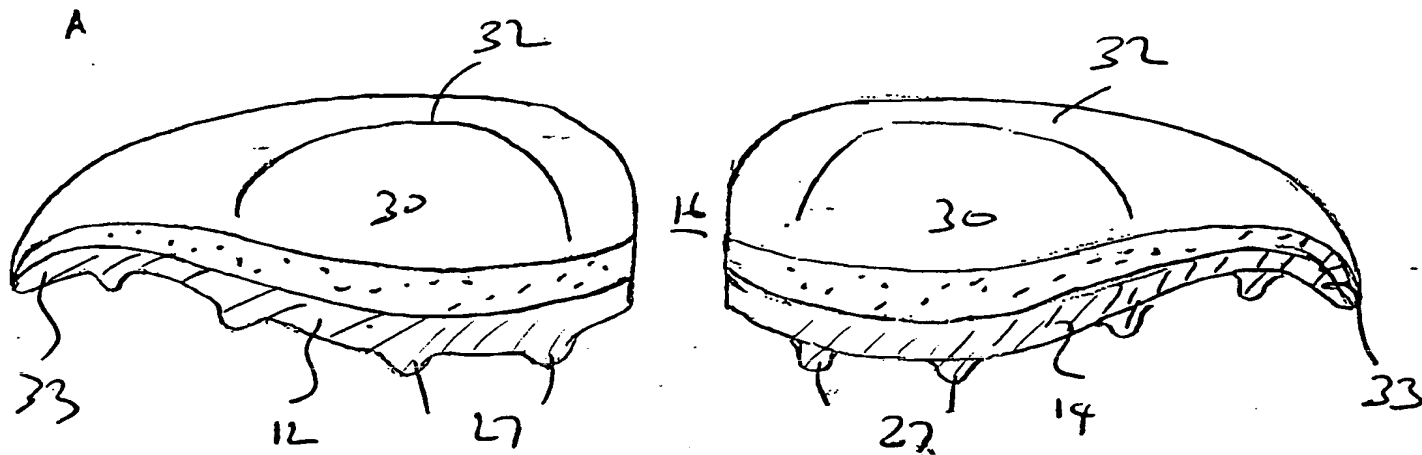


A



B





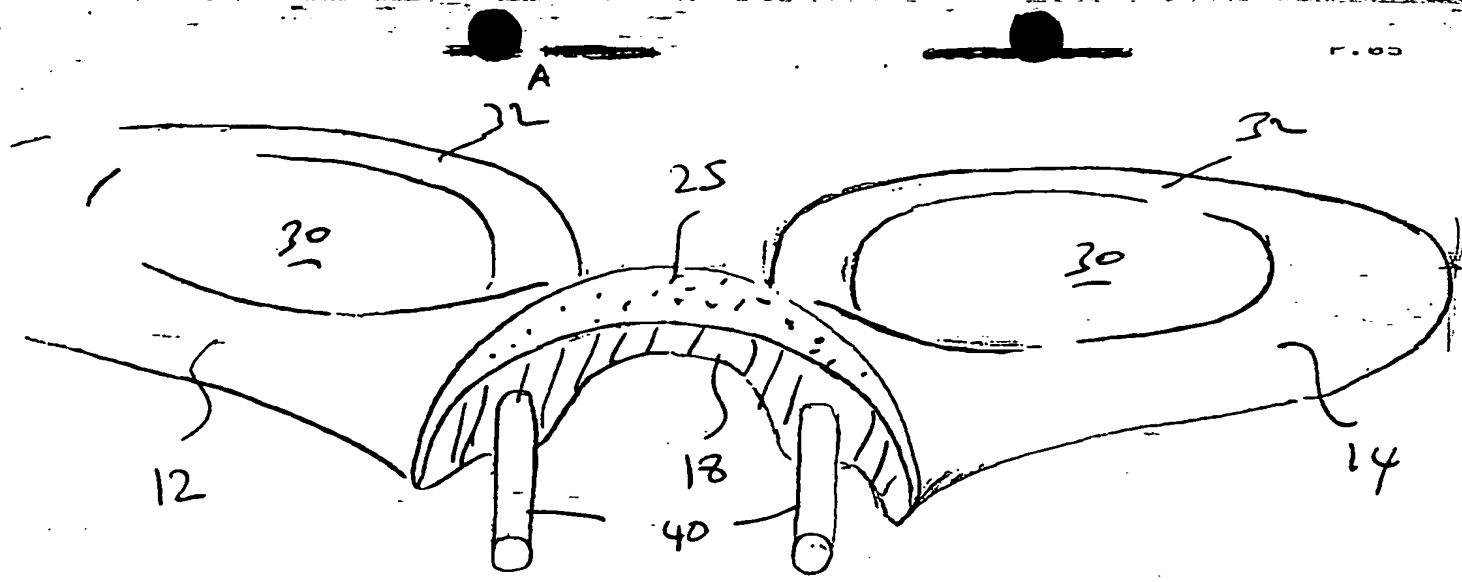


Fig 14

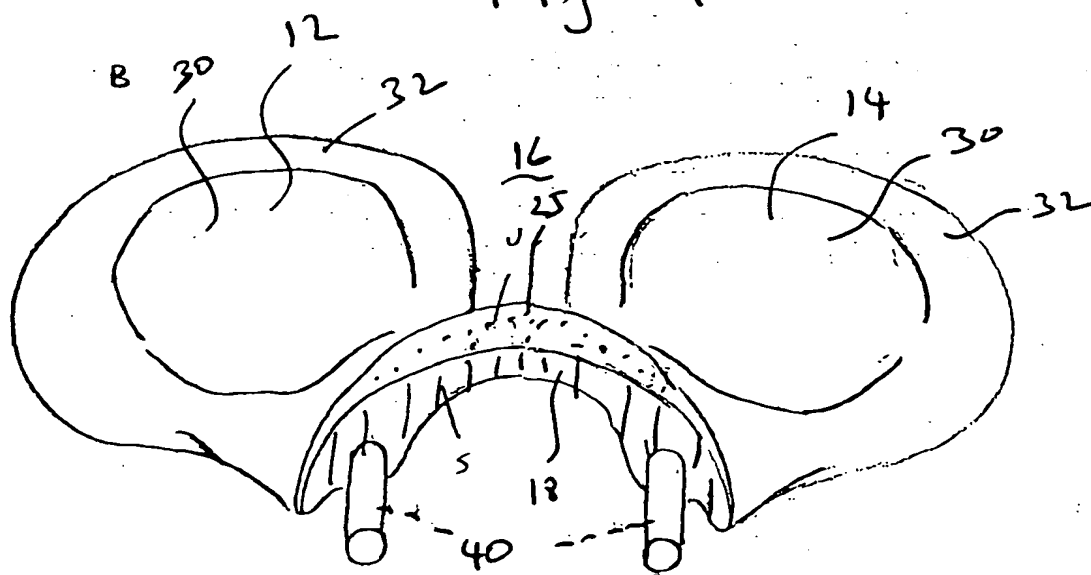
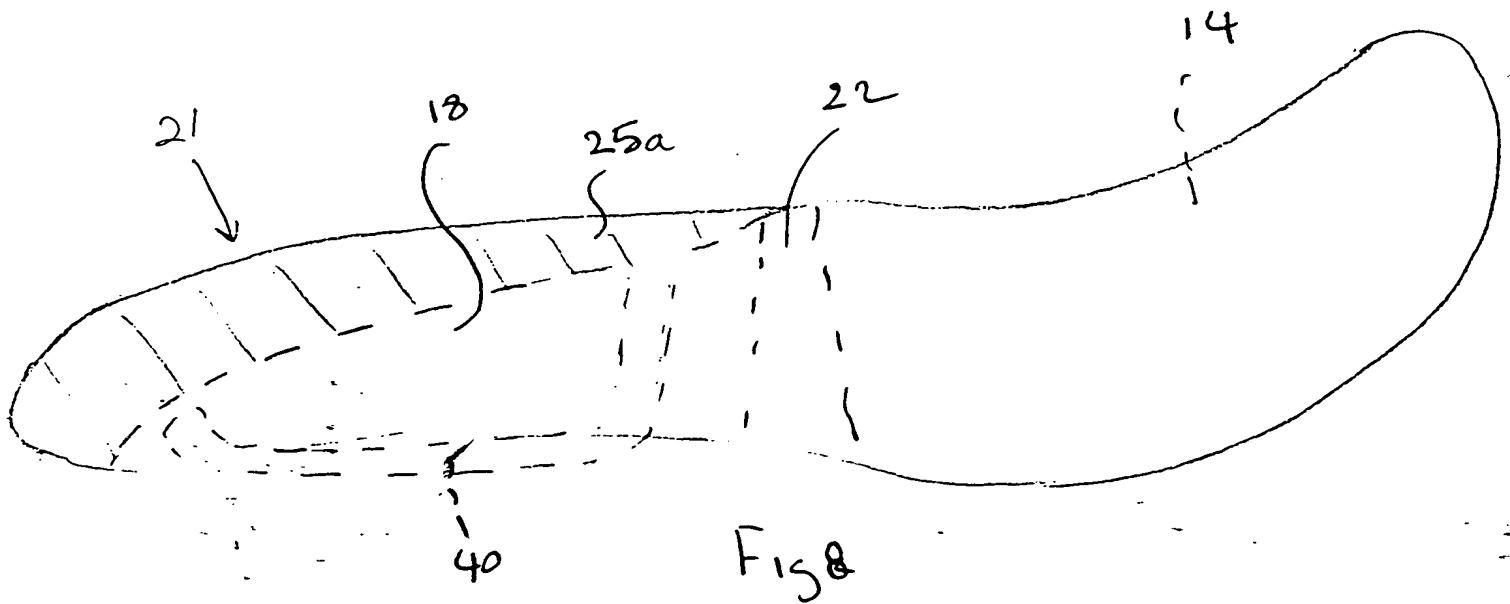
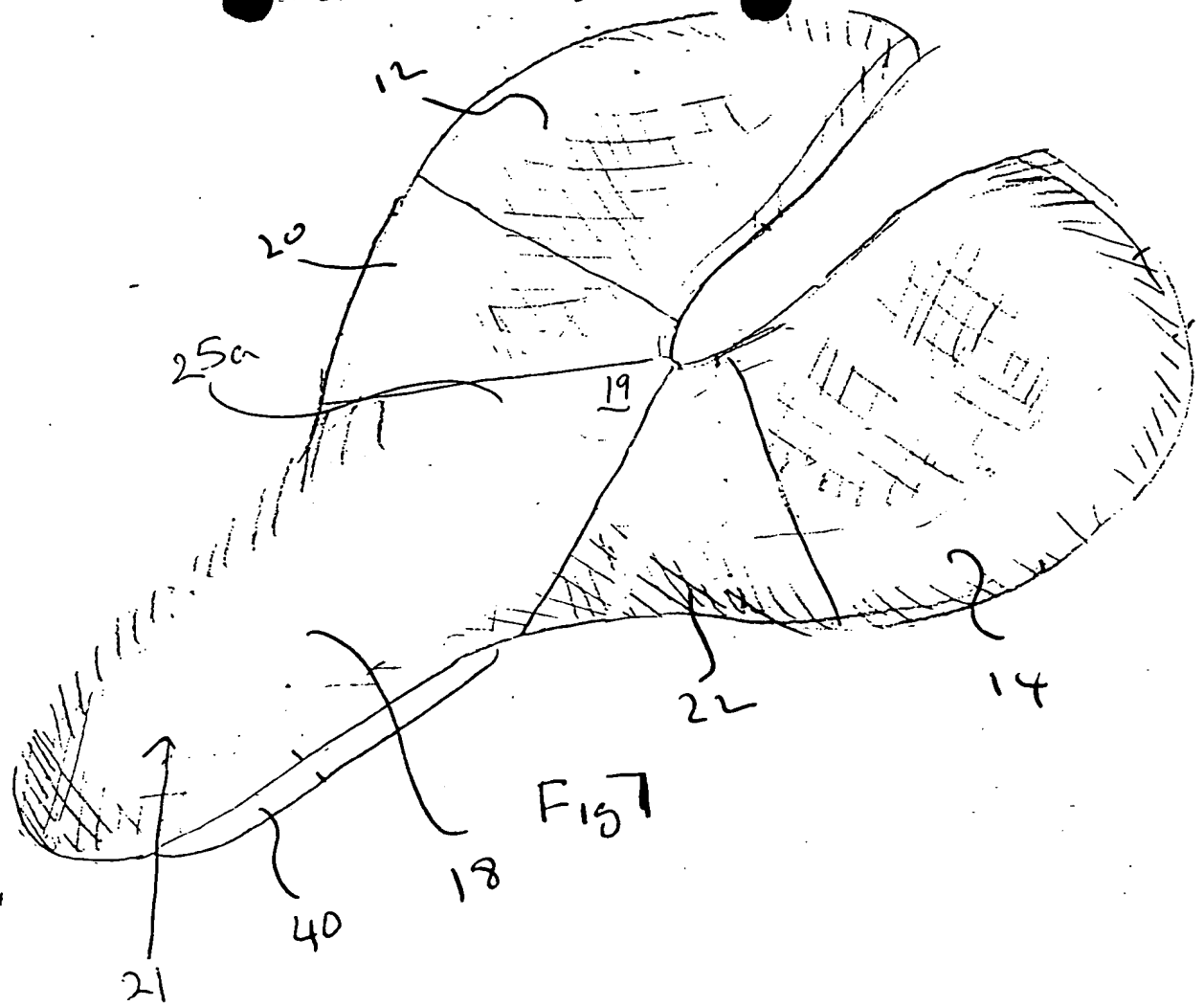


Fig 6







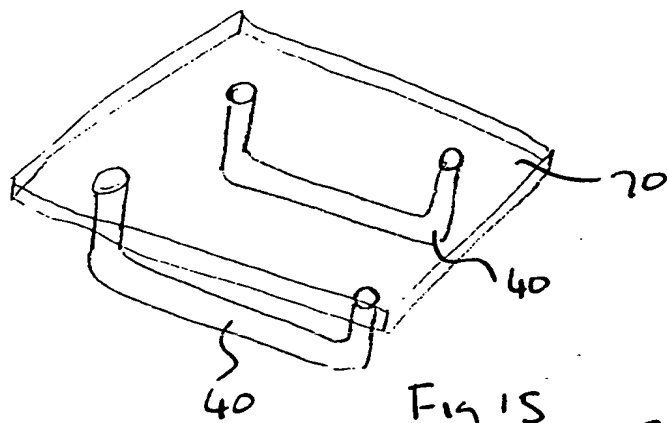


Fig 15

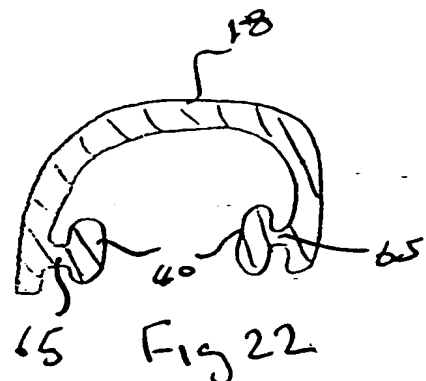


Fig 22

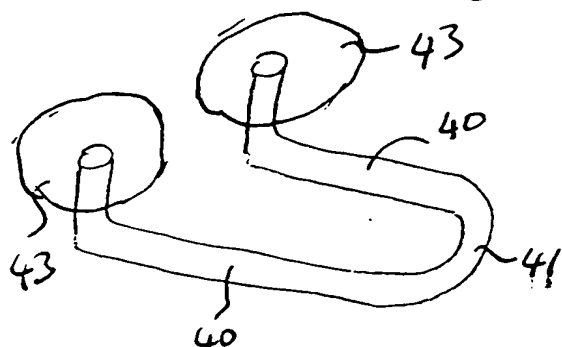


Fig 16

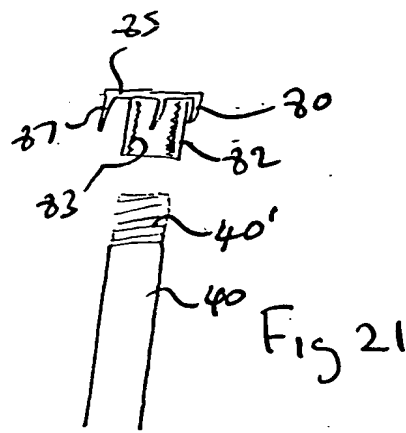


Fig 21

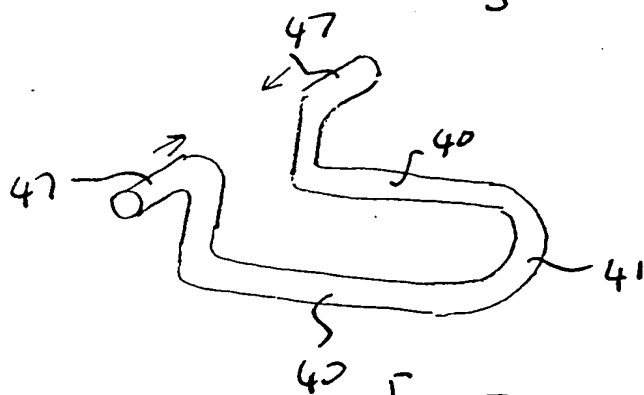


Fig 17

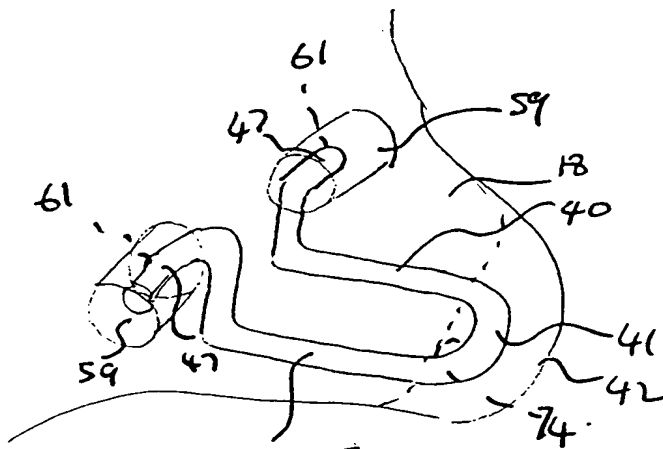


Fig 18

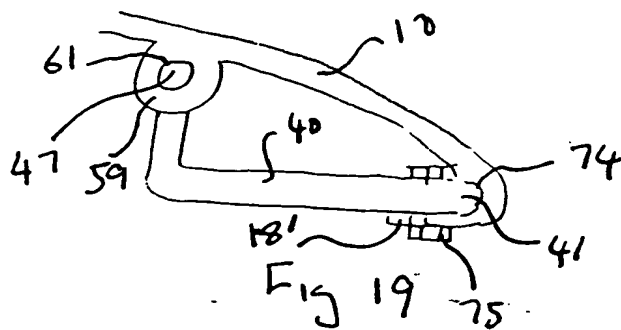


Fig 19

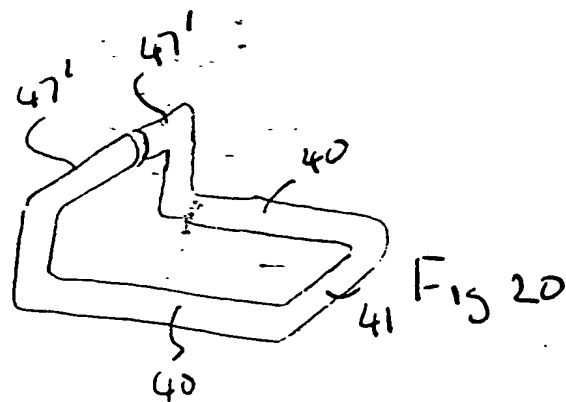


Fig 20

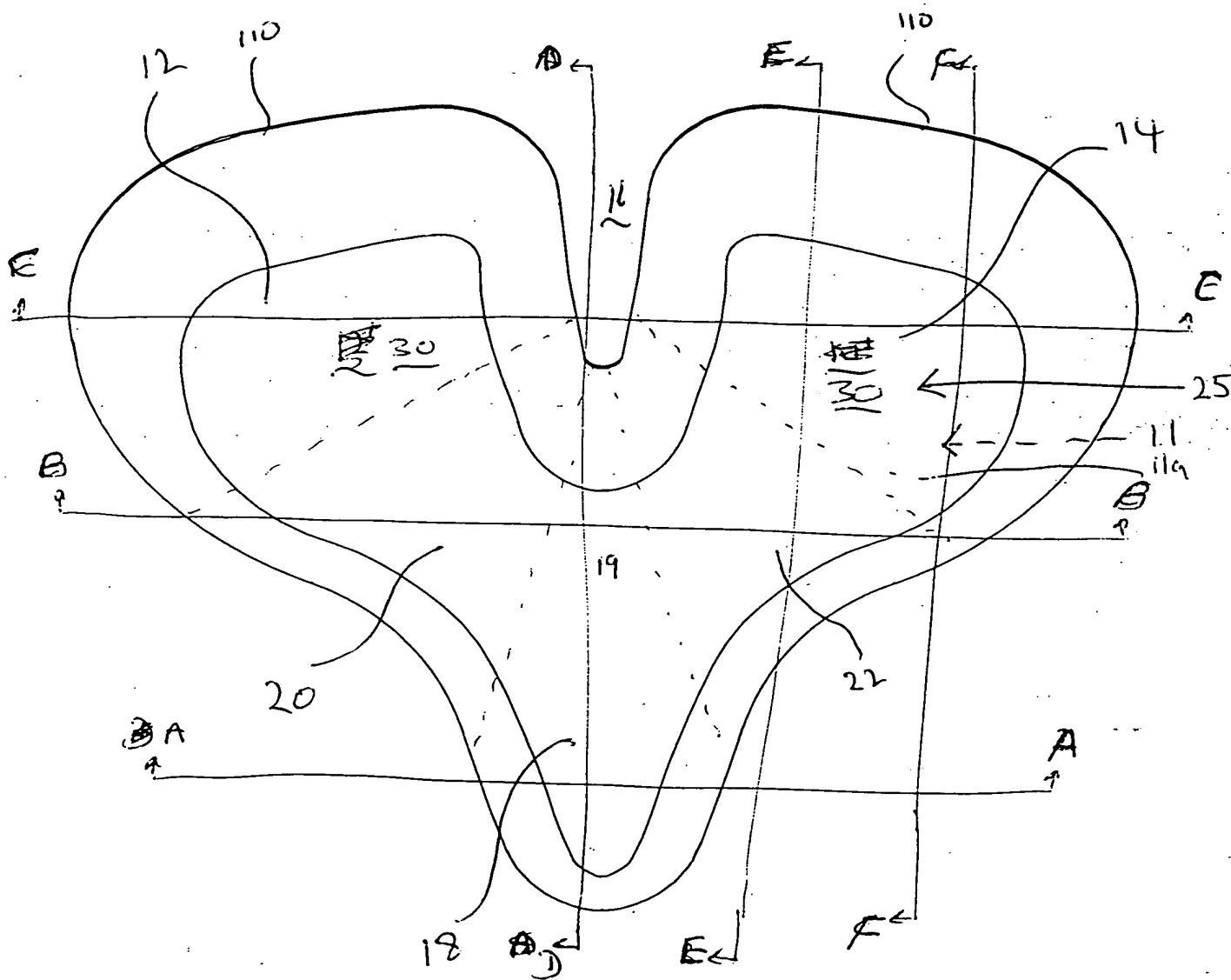


Fig 23

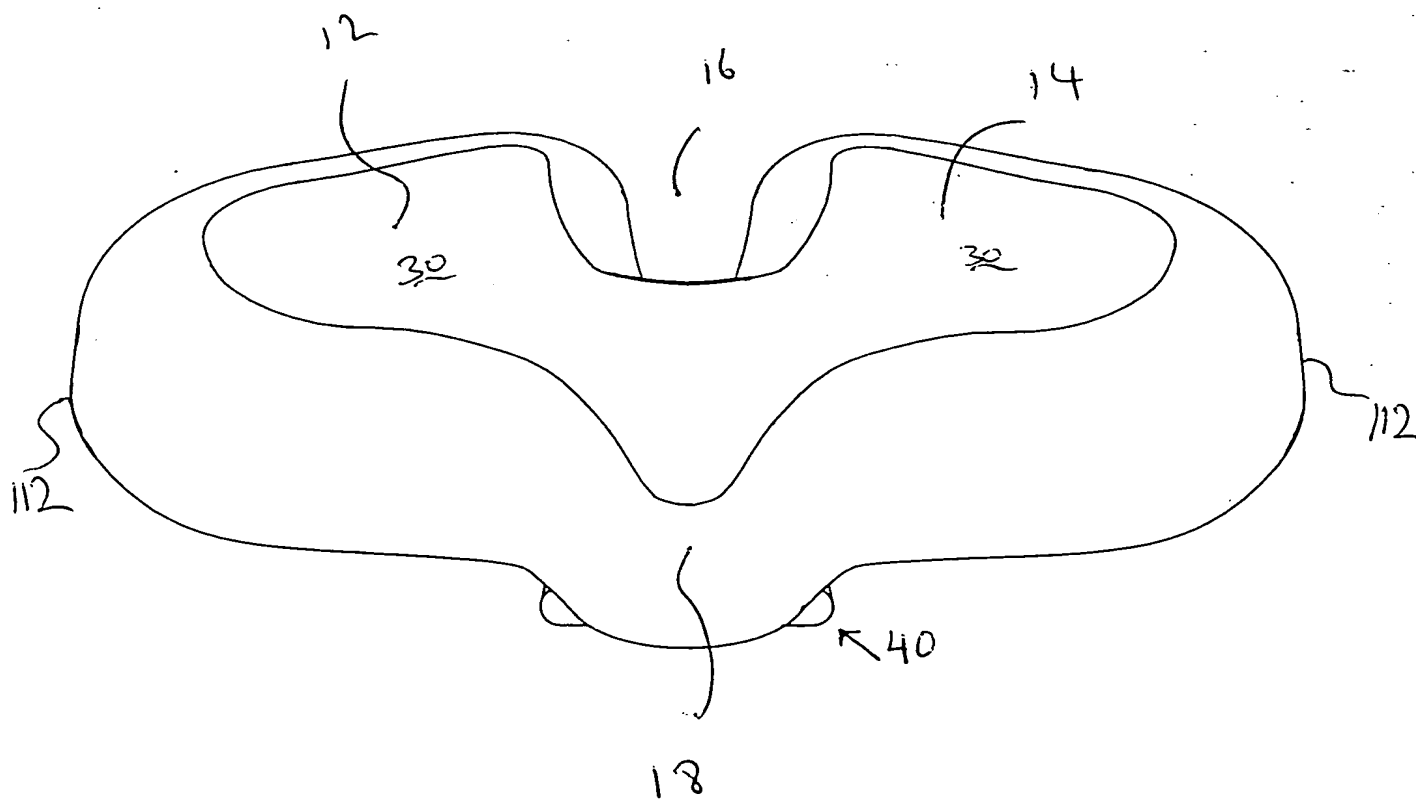


Fig 24

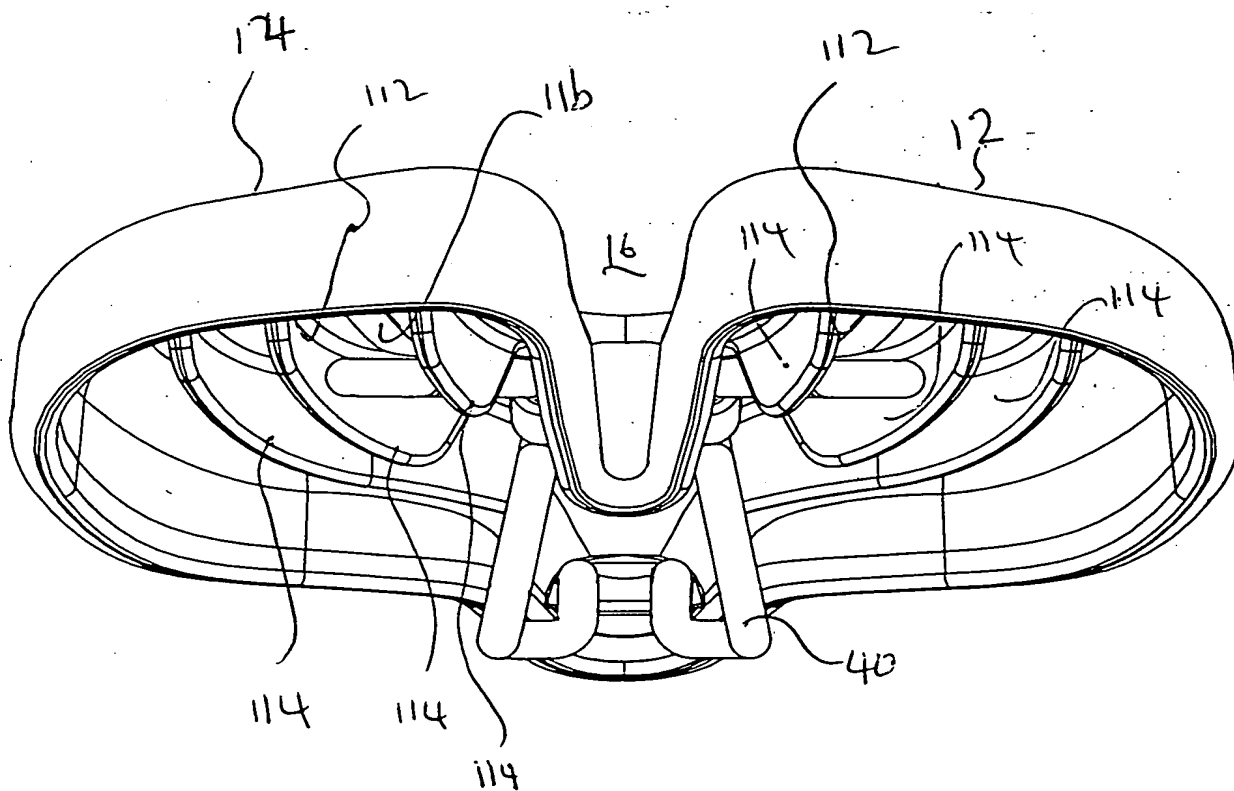
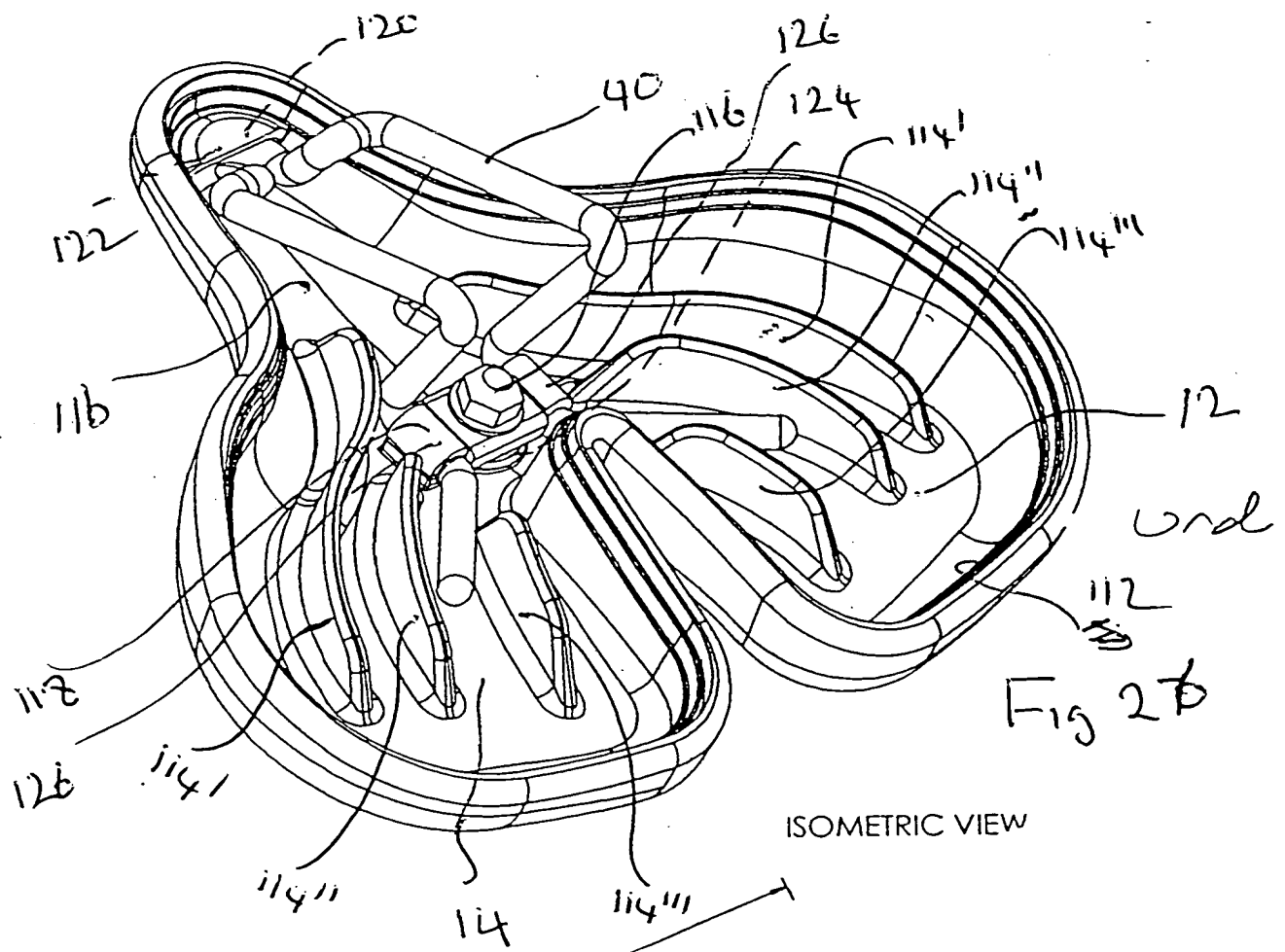


Fig 25



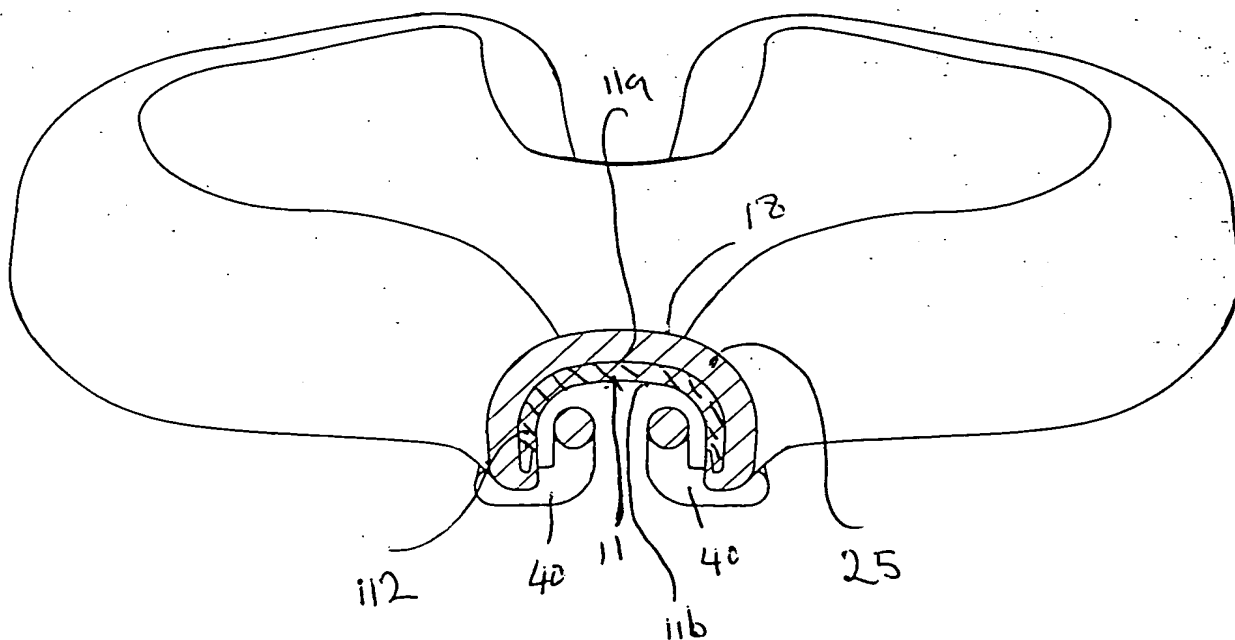
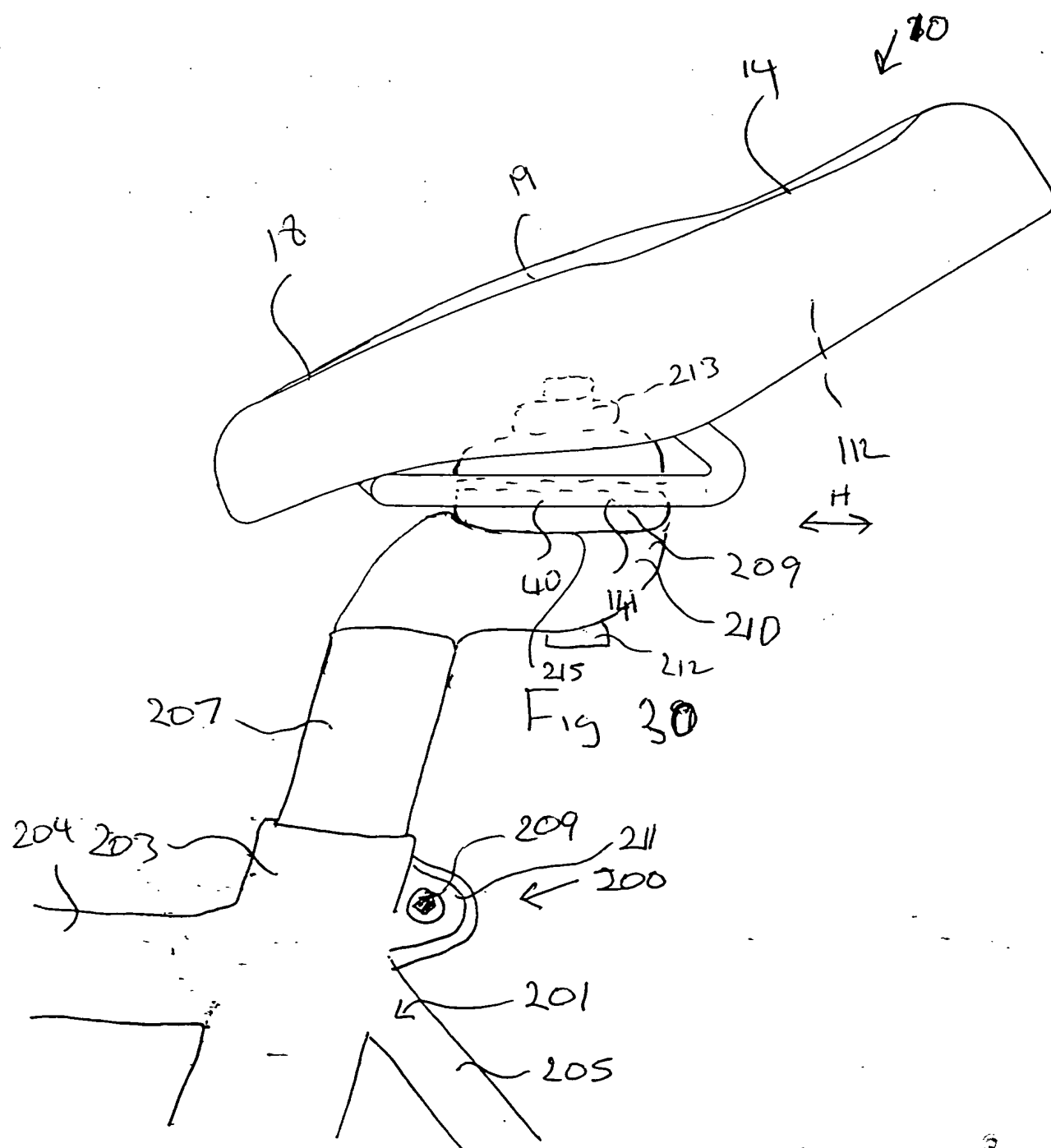


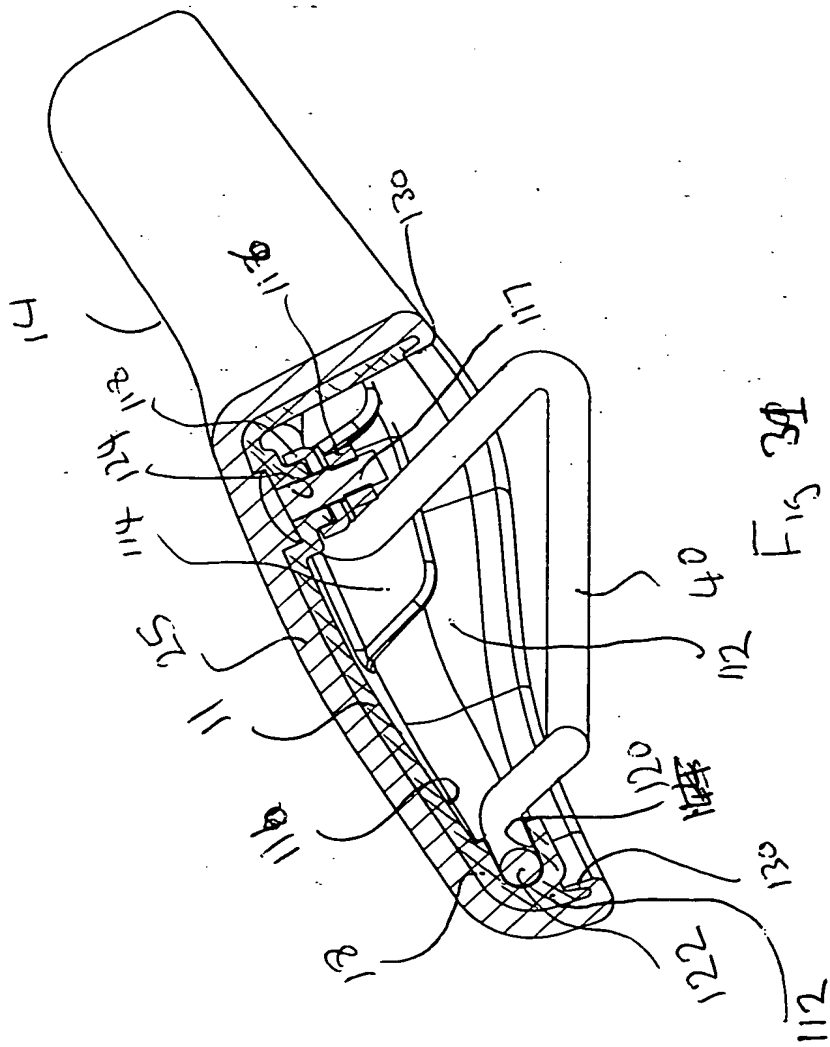
Fig. 27

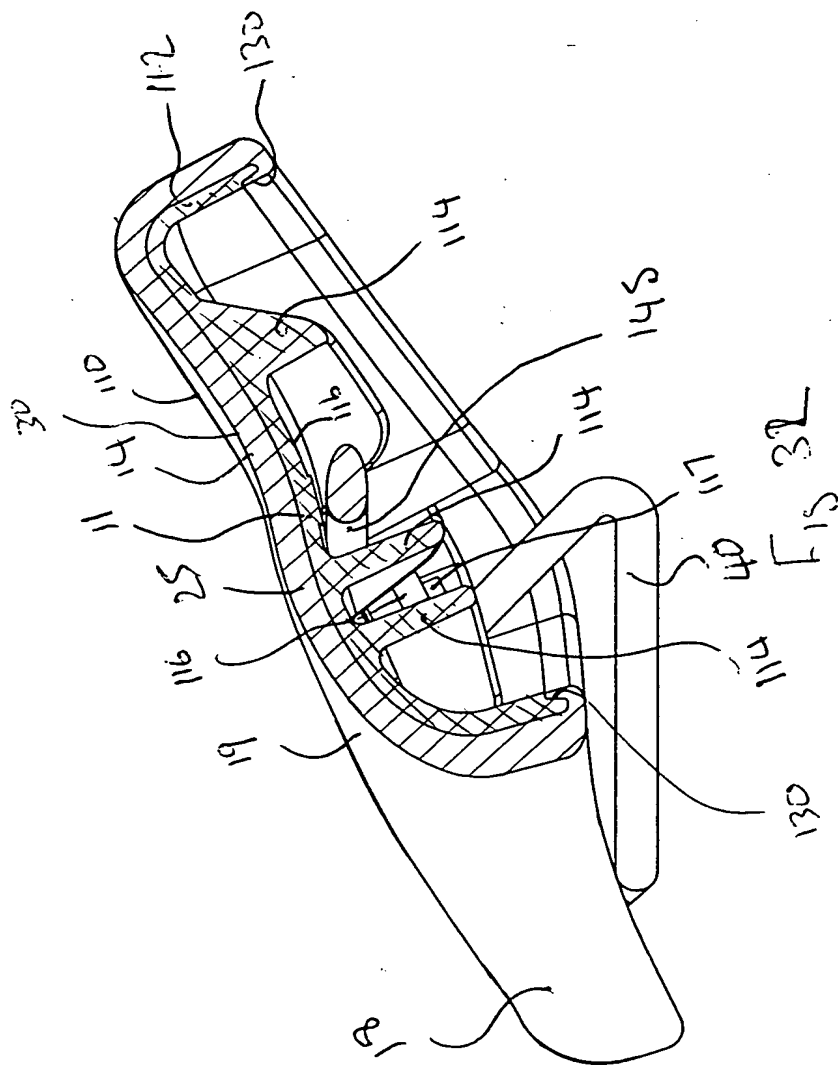












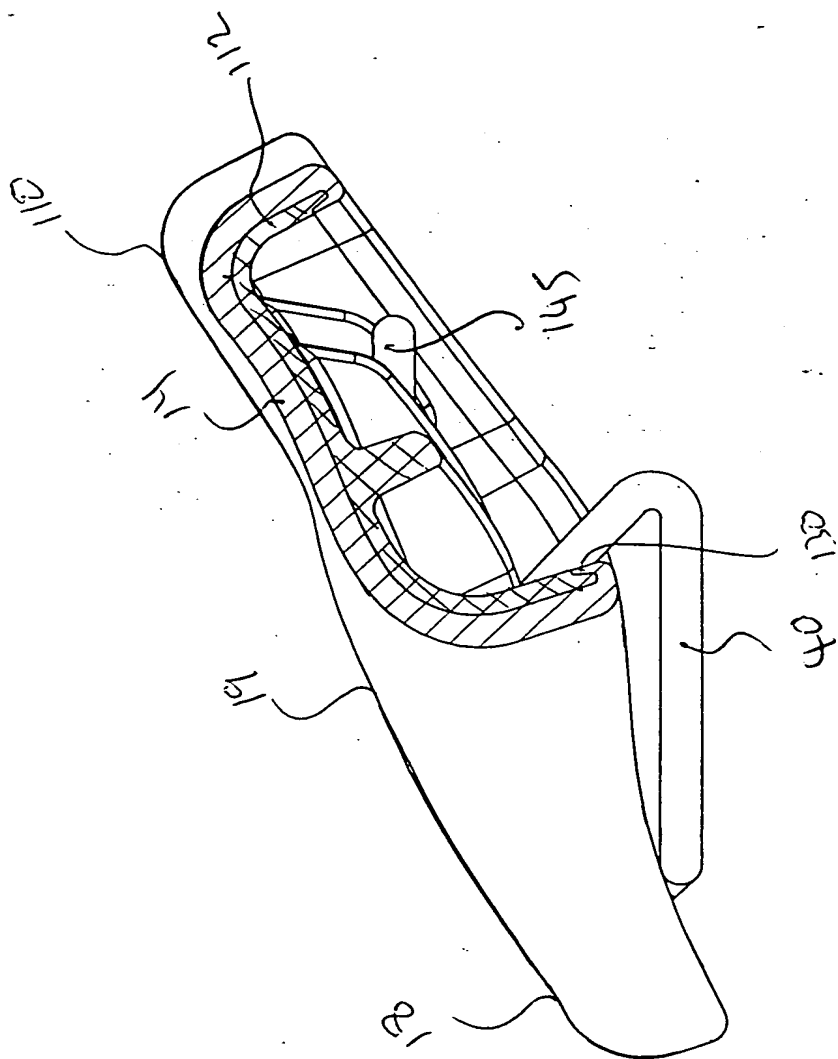


Fig. 3b

Fig. 3a

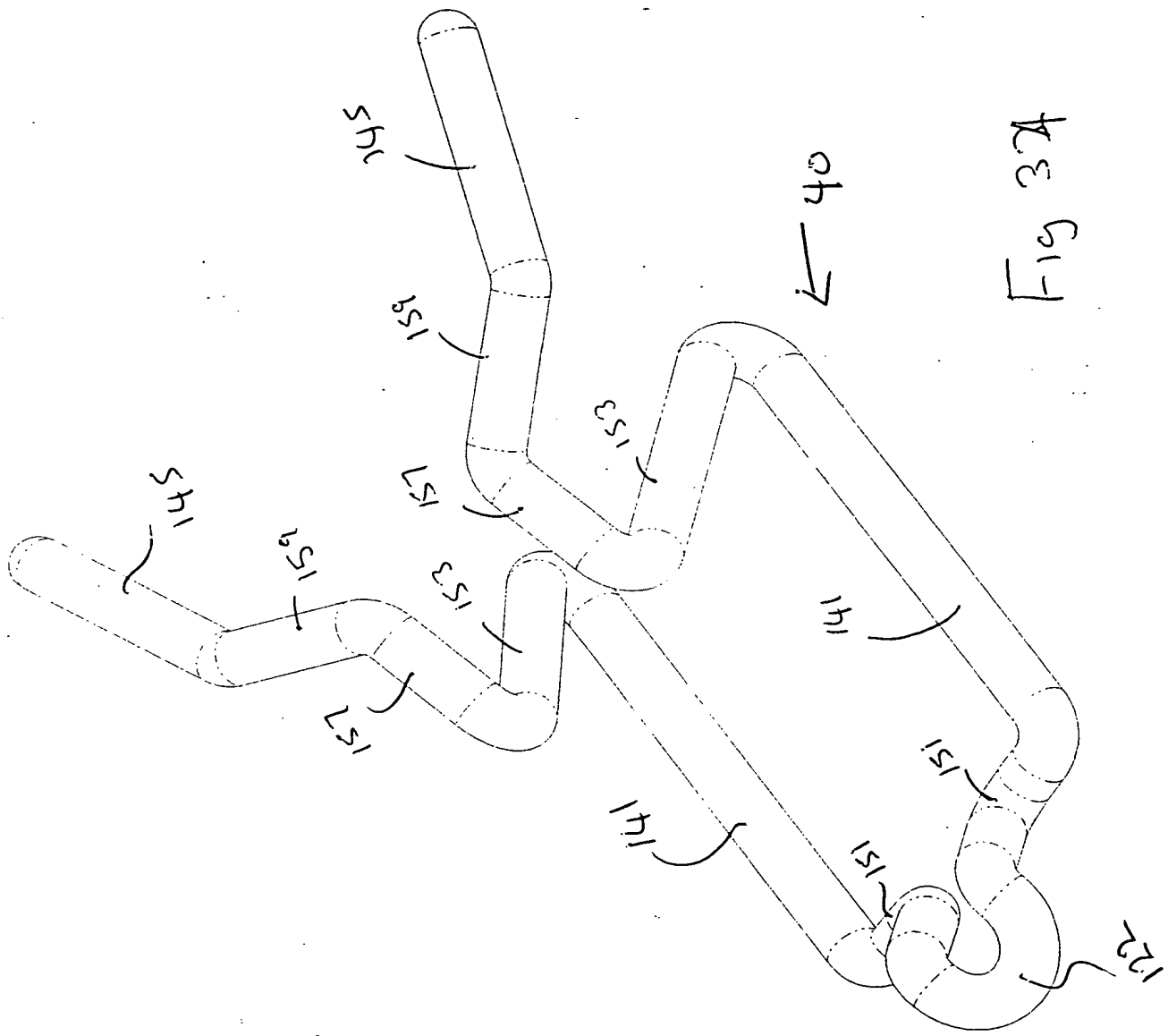


Fig 34

~~FIG. 35~~

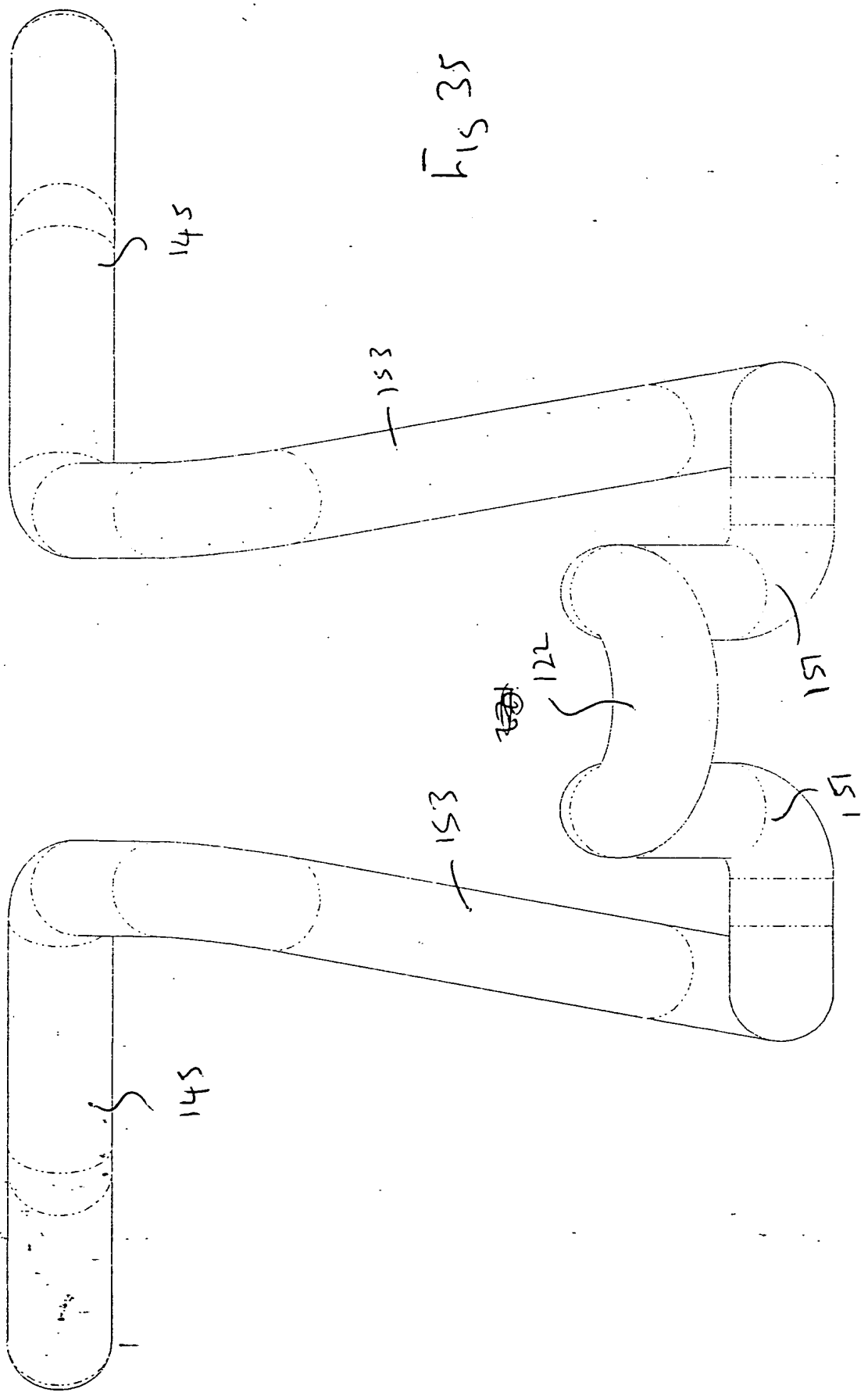


FIG. 35

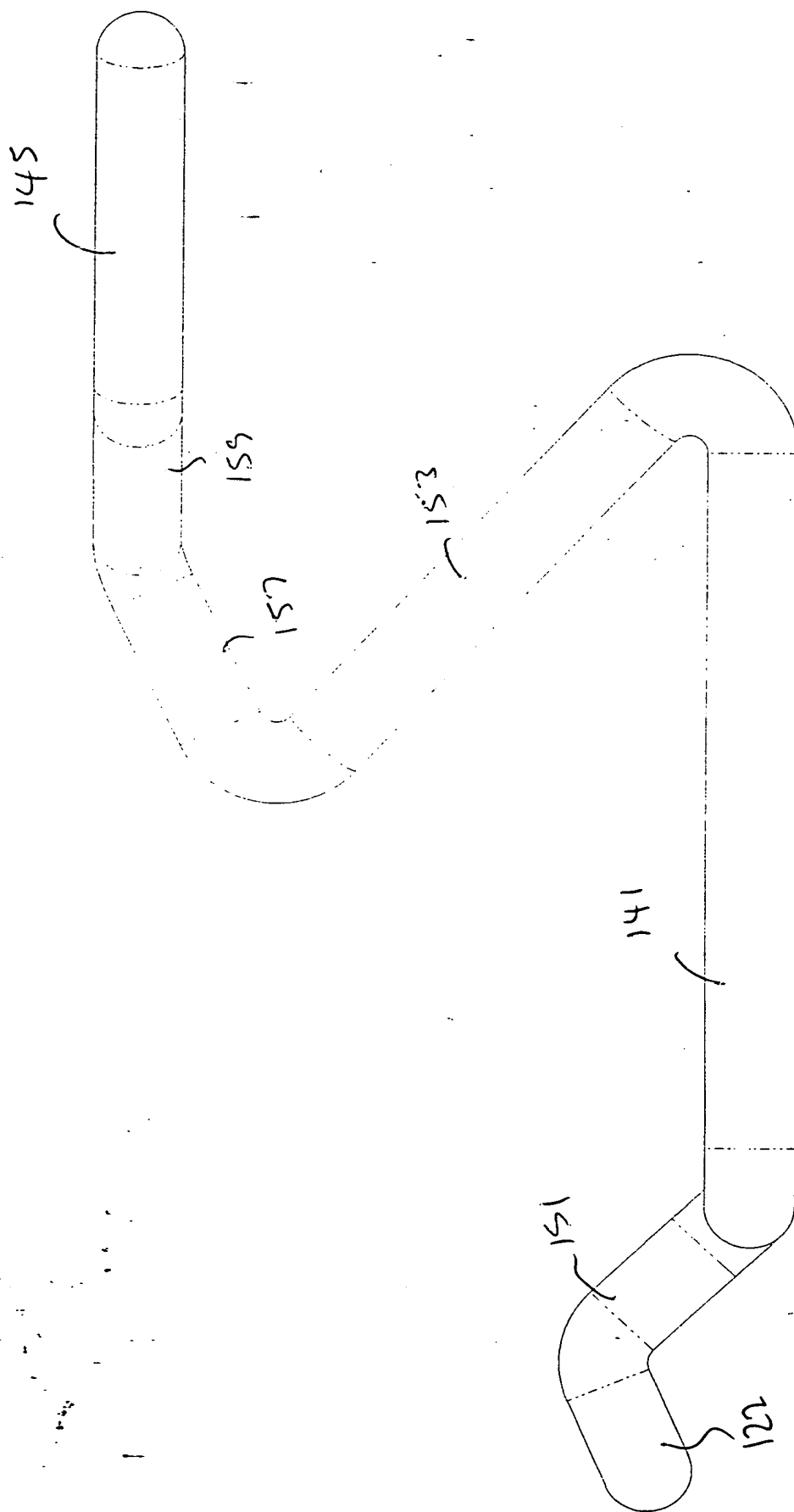


Fig 36



**This Page is Inserted by IFW Indexing and Scanning  
Operations and is not part of the Official Record**

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

☒ BLACK BORDERS

☐ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES

☐ FADED TEXT OR DRAWING

☒ BLURRED OR ILLEGIBLE TEXT OR DRAWING

☐ SKEWED/SLANTED IMAGES

☐ COLOR OR BLACK AND WHITE PHOTOGRAPHS

☐ GRAY SCALE DOCUMENTS

☐ LINES OR MARKS ON ORIGINAL DOCUMENT

☐ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY

☐ OTHER: \_\_\_\_\_

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.**

**THIS PAGE LEFT BLANK**